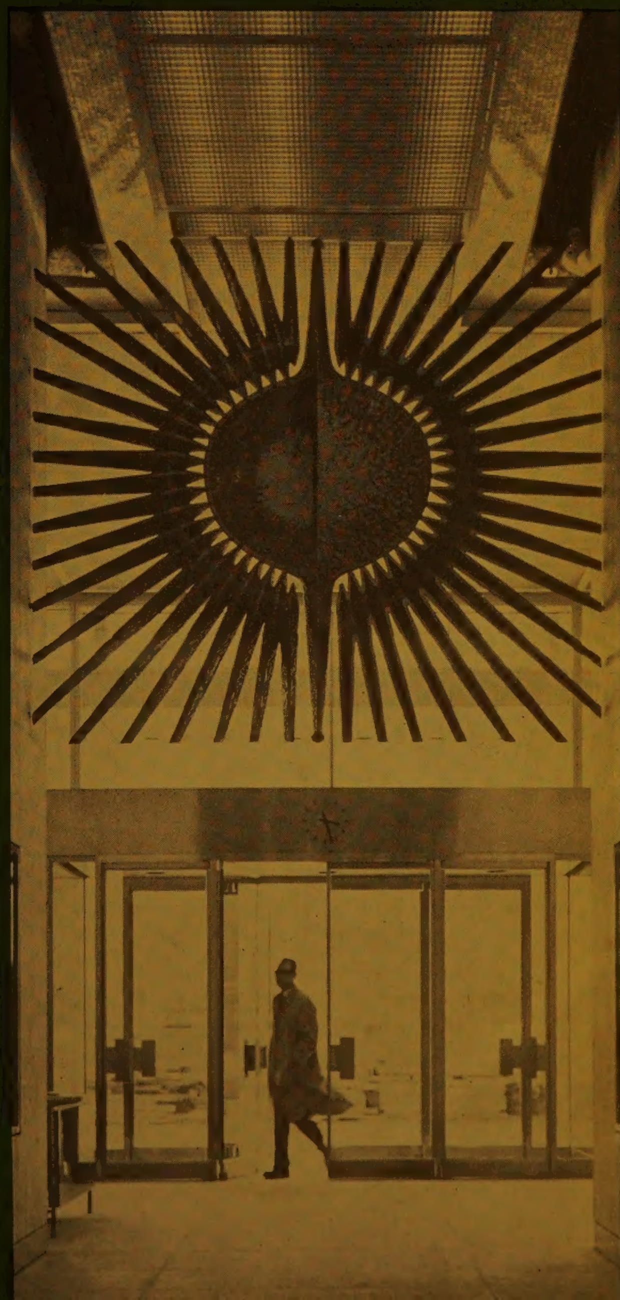
ROYAL ARCHITECTURAL INSTITUTE OF CANADA JOURNAL

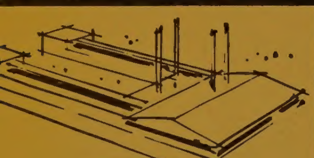


TEMBER 1961
YAL ARCHITECTURAL INSTITUTE OF CANADA
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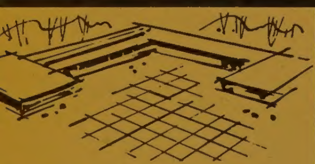
NEW COMPACT TRANE CLIMATE CHANGERS



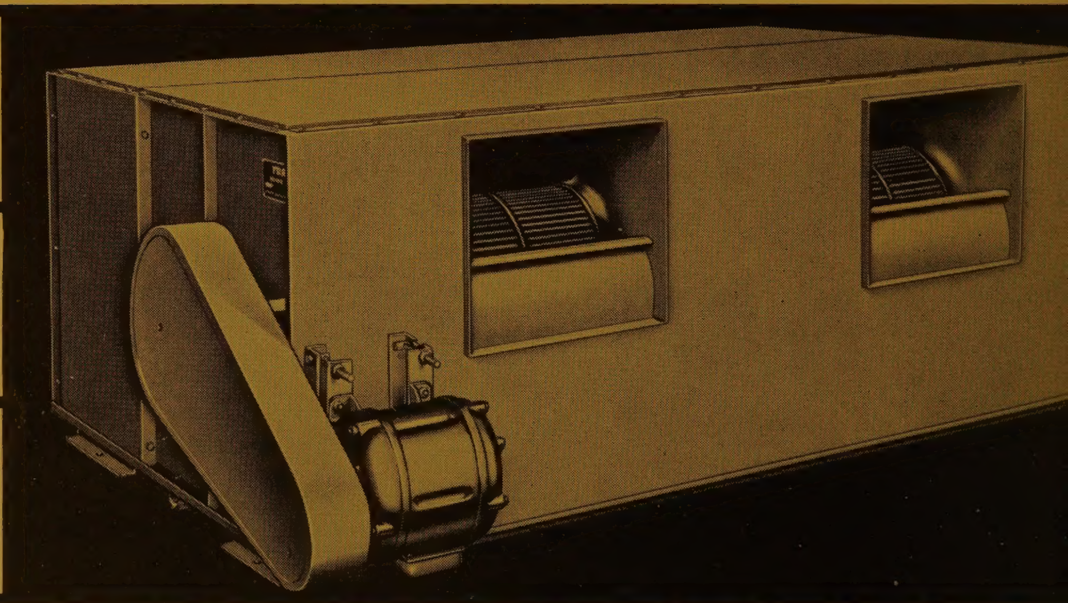
Commercial office buildings



Industrial plants



Department stores and super markets



NEW DESIGN! NEW COMPACT SIZES! NEW HIGH-LEVEL PERFORMANCE!

Everything's new but the name 'Climate Changer'! This new amazingly compact TRANE unit was designed, tested and *proven* at the TRANE *House of Weather Magic*. Now it's yours, to solve air-handling problems in new or renovated buildings!

The revolutionary new TRANE coil provides the ultimate in heating. And note this: the addition of a refrigeration coil converts the same unit into a highly efficient air-cooling unit for summer. A bonus profit-maker for you! No matter what your application, these new TRANE Climate Changers can be selected, step by step, to meet individual requirements. *14* compact sizes, from 3 to 63 sq. ft. coil area. Draw-through and Multi-Zone models in low and medium pressure types, in a wide range of capacities from 1,200 to 47,000 cfm.

Get the full facts *now!*

Ask your TRANE Representative about this newest-of-new TRANE Climate Changer!

TRANE

Manufacturers of equipment for air conditioning, heating and ventilating.

TRANE COMPANY OF CANADA, TORONTO 14, ONTARIO

Have window coverings kept pace with architectural trends?

More glass. More daring, dramatic use of glass. This certainly is the trend in commercial building. The Flexalum people have matched new building trends with new window covering designs and innovations. Among them — "fixed-tilt" blinds adjusted to open only at pre-set angles in order to maintain uniform exterior appearance . . . fixed position blinds which open or close to specially chosen heights . . . "between glass" blinds for special installations . . . elegant Stellair traversing screens . . . Sun Vertikal louvres . . . and others. Choosing a permanent, window covering that's different, good-looking *and* practical presents no problem when you have the Flexalum story at your fingertips. Write for the Flexalum window covering reference library of literature . . .

Hunter Douglas Ltd., P.O. Box 90, Youville Station, Montreal, P.Q.

Makers of Flexalum window coverings, aluminum awnings and siding, and Klad Koil coated metals.

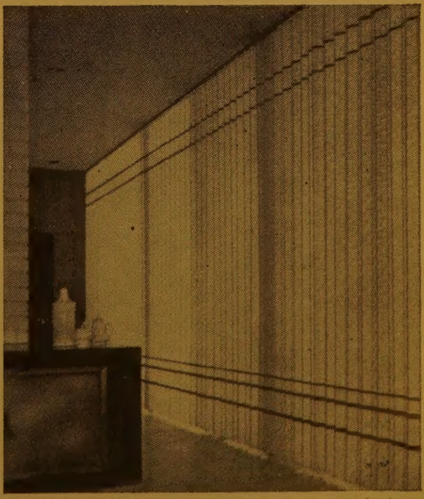
Flexalum



Sun Vertikals . . . window louvres of fabric or aluminum rotate to give the effect — and effectiveness — of a vertical design sun shield. Cool and crisp-looking inside; decisive, striking from the outside. Ideal for lobbies, street level openings.



Flexalum verticals . . . louvre-like blinds to provide infinite range of light control, ventilation without drafts. Draw like drapes . . . to give classic vertical lines suited equally to contemporary and traditional architecture.

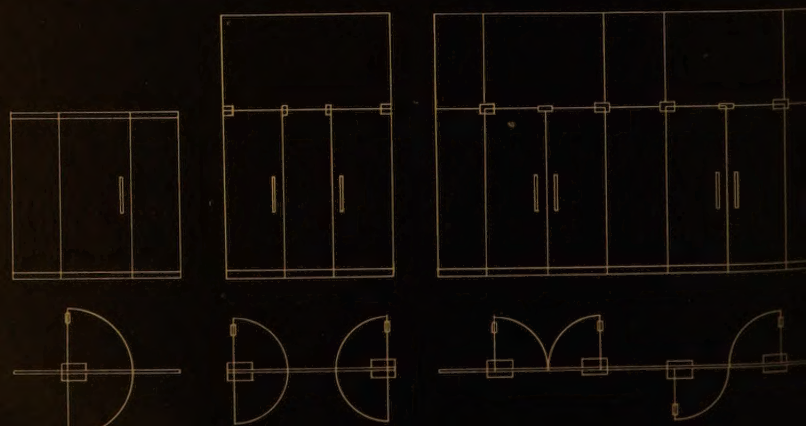


Flexalum Stellair . . . permanent window covering with a flair. Custom assembled of 3-inch translucent, fade-proof plastic modules. Admits light, air. Rejects glare. Most compact folding ratio available . . . one foot folds back into one inch!

A NEW CONCEPT..



The AllGlass Entrance, above, was custom designed for Henry Birks and Sons Ltd., Yonge Street, Toronto store by the architectural firm of Wilkes, Wasteneys and Wilkes, Toronto. AllGlass Entrances are fabricated from tempered ½ inch Polished Plate Glass, with unobtrusive metal fittings on the top and bottom edges. Its uses for stores and showrooms, and entrances to office and public buildings are unlimited. Coupled with matching side panels and transoms, it can fill an entire front with a captivating all-glass assembly.



PILKINGTON AllGlass ENTRANCES

ilkington AllGlass Entrances give an inviting open look. This new concept iminates the visual barrier of conventional doors. The Pilkington AllGlass ntrance is the perfect answer for clear vision and attractive appearance.

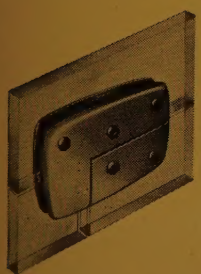
The AllGlass Entrance incorporates rmourplate* Tempered Glass Doors with atching side panels and transoms.

Each assembly is guaranteed for three years ainst breakage of glass.

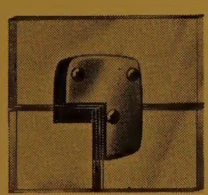
- It has no posts or transom bars, being an uninterrupted expanse of glass that can be expanded to include the whole frontage of a building up to two stories high.
- It comes completely weatherstripped.

**Registered Trade Mark*

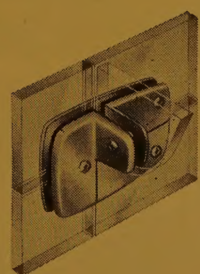
TYPICAL AllGlass FITTINGS



smooth transom to side anel fitting, with self-lubri-ting bush. Combined with oor pivot.



This clean, compact patch fitting links the transom to side panel, includes a stop for adjacent single-action door.



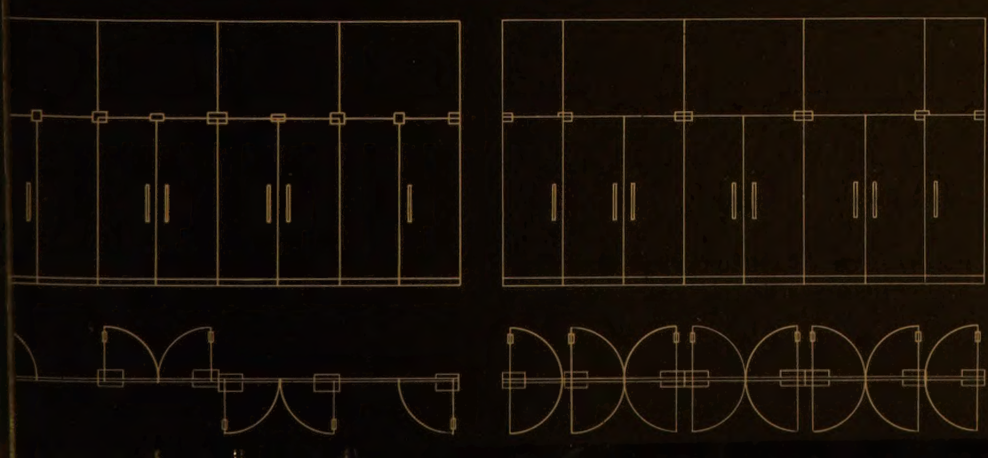
Transom, fin and divided side panel fitting has a self-lubricating bush. Combined with door pivot.

Pilkington

GLASS LIMITED

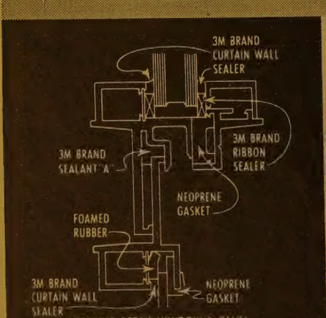
55 EGLINTON AVENUE EAST
TORONTO, ONTARIO
23 BRANCHES COAST TO COAST

For complete information on the AllGlass Entrance, contact Pilkington

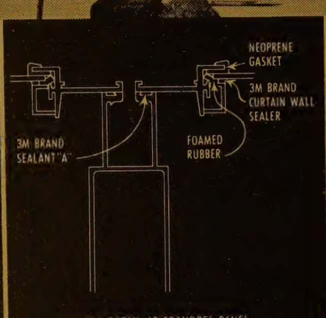








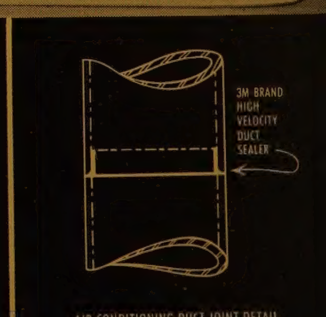
SEALING DETAIL WINDOW & PANEL



MULLION DETAIL AT SPANDREL PANEL



DETAIL OF FLANGED JOINT IN RECTANGULAR DUCT



AIR CONDITIONING DUCT JOINT DETAIL

Speed, economy and quality are vital in construction of buildings like the new Sun Life Head Office in Toronto. This is the reason 3M Brand Adhesives, Coatings and Sealers were selected for this project. And that's why more and more progressive planners specify these modern *quality* products. There's a complete line—for further information get in touch with your nearest 3M office.

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Footcandle Calculation Table - Point By Point Method
Horizontal Distance from Axis of Light Source - Feet
look what's happening to
candlepower...
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Northern Electric

for a complete lighting service!

EXHIBIT BUILDING, The Thousand Islands, Ontario.

Architect H. H. ROBERTS, M.R.A.I.C., Westport, Ontario.
General Contractor TOWER COMPANY LIMITED, Montreal, Quebec.
Electrical Contractor G. COLIGAN, Prescott, Ontario.



The Exhibit Building at the new Hill Island Development at the Thousand Islands, Ontario is part of a 350-acre resort area which is presently being developed by International Resort Facilities Limited. As part of the initial development, the Exhibit Building and its lighting indicate the modern concept that will be applied throughout the area. An interesting variety of lighting equipment is used to illuminate this building and surrounding area, with each unit selected to provide the *right* light at the *right* place and to complement each other. All of the lighting equipment, including lamps, was supplied through the Northern Electric lighting service. The products of many leading illumination manufacturers are conveniently available from Northern Electric and our lighting specialists will gladly assist you in the planning of efficient indoor and outdoor lighting systems.











The interior of the building is complemented by colourful "super hi-lite" units suspended from the ceiling. In another section, a modern, flexible lighting system is provided through the use of lighting duct and cone-shaped fixtures containing reflector spotlights.

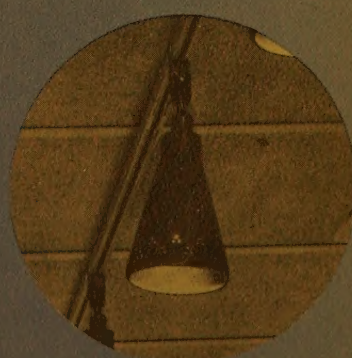


The exterior of the building is strikingly illuminated with sodium floodlights and large twin cone fixtures. Twin cone fixtures mounted on aluminium flagpoles illuminate the flags and the immediate approach to the building. Decorative luminaires and standards are used to illuminate walkways and landscaped areas.









1 ONE SOURCE OF SUPPLY FOR THE MANY SOURCES OF LIGHT



Northern Electric can supply quality equipment to meet all lighting objectives, whether your need is for the illumination of commercial or industrial buildings, shopping centres, streets and sidewalks, park areas or sports stadiums.

A single call to your nearest Northern Electric office will give you immediate access to information on the technical aspects and availability of the products of most of the leading illumination manufacturers.





Use the **NORTHERN ELECTRIC** ***LIGHTING SERVICE***

— our lighting specialists will be pleased to assist in the planning of any interior or exterior lighting layout.

Northern Electric
COMPANY LIMITED

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solar shading fabrics

for soft, diffused light,
heat control and economy too!

THESE DECORATIVE WINDOW TREATMENTS HAVE MANY ADVANTAGES OTHER METHODS CAN'T OFFER

Fiberglas* Fenestration Fabrics reduce solar heat transfer as effectively as, or better than other accepted shading devices. These soft, neutral shade fabrics add new beauty to windows. They minimize glare by diffusing *all* the light—even direct sunlight—yet still allow "see-through" visibility.

Fiberglas Fenestration Fabrics also provide efficient sound absorption as a bonus property. Understandably, the NRC values vary with the weight and construction of the fabric selected. Some fabrics are equivalent to acoustical ceiling tile in sound absorbing action.

Because they're made of glass, Fiberglas Fenestration Fabrics are fire safe. They can't sag or shrink; they're rot-, mildew- and pest-proof, and have excellent resistance to fading. Maintenance costs are cut to a fraction because only inexpensive wet washing is ever required. No ironing is needed, and they should never be dry-cleaned. And with exceptional durability, they stay new-looking years longer than conventional window fabrics.

*T.M. Reg'd.

HEAT SHADING PROPERTIES

	SHADING COEFFICIENTS	S_f †	S_{fi} ‡	U Value §
No Sun Control	Double Strength Glass	1.00	1.00	1.13
	Regular Plate Glass	.95	.86	
	Heat Absorbing Glass	.68	.66	
	Regular Double Plate	.83	.79	.56
	Heat Absorbing Double Plate	.56	.53	
White Venetian Blinds	Regular Plate Glass	.55	.60	.90
	Heat Absorbing Glass	.53	.52	
	Regular Double Plate	.51	.51	.53
	Heat Absorbing Double Plate	.31	.36	
Fiberglas Off-White Draperies Transmittance—0.35 Reflectance—0.60	Regular Plate Glass	.44	.39	.84
	Heat Absorbing Glass	.39	.35	
	Regular Double Plate	.43	.39	.51
	Heat Absorbing Double Plate	.32	.29	
Fiberglas Tan Draperies Transmittance—0.14 Reflectance—0.42	Regular Plate Glass	.53	.47	.84
	Heat Absorbing Glass	.53	.48	
	Regular Double Plate	.51	.46	.51
	Heat Absorbing Double Plate	.35	.32	

†*Shade Factor for direct radiation* ‡*Shade Factor for diffuse radiation* §*Transmittance air to air*

NOISE REDUCTION COEFFICIENTS

Typical Fiberglas Fenestration Fabrics

FABRIC DESCRIPTION		COEFFICIENTS[1]						
Weight oz./sq. yd	Filling Yarn Structure	125 cps	250 cps	500 cps	1000 cps	2000 cps	4000 cps	NRC
8.4	Aerocor	.09	.32	.68	.83	.76	.76	.65
7.9	Heavy Boucle	.08	.20	.34	.44	.39	.48	.34
6.1	Boucle	.08	.13	.21	.29	.23	.29	.21

[1]*Mounting: fabric tailored to 100% fullness with 5" air space from rigid backing to fabric.*
SOURCE: *Geiger and Hamme, Acoustical Consultants, June 12, 1959.*

SPECIFY THIS FULL FAMILY OF FIBERGLAS PRODUCTS

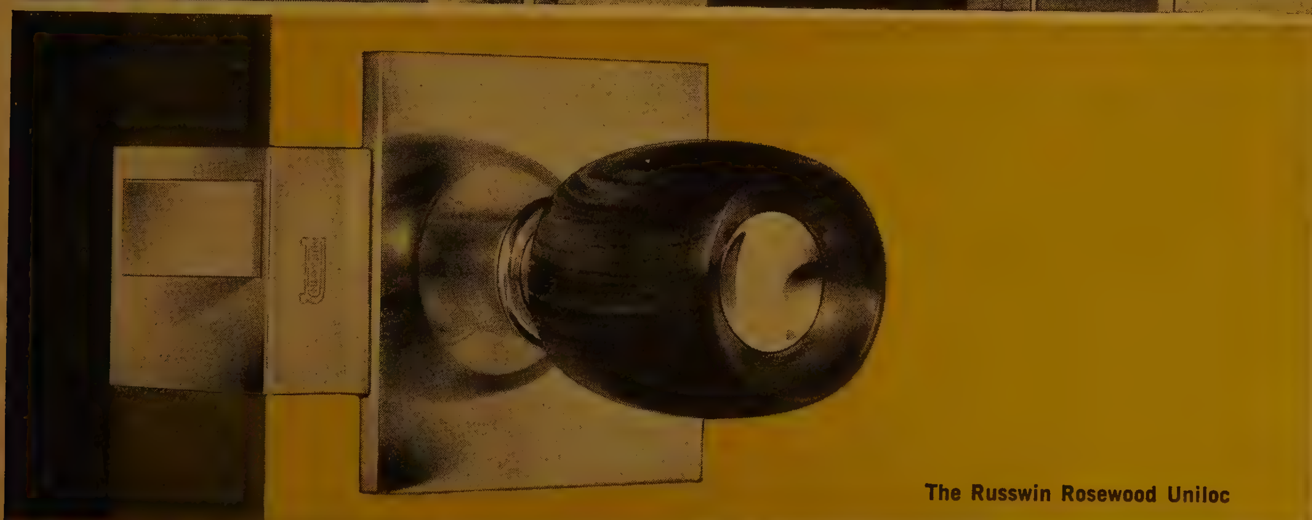
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- Wall Insulations
- Pipe Insulations
- Sound Control Products
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- Light and Heat Control Products

FIBERGLAS CANADA LIMITED

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AIA/RAIC Nos. 35-P-3 and 28-D-1





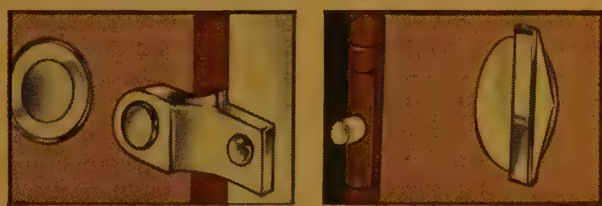
The Russwin Rosewood Uniloc



oilet Compartments with the NEW LOOK

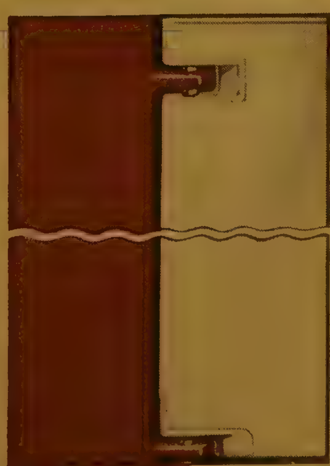
The new look provides a clean-cut appearance that architecturally in keeping with any layout or decor.
The surfaces are uninterrupted by projections . . .
w integral hinge brackets are flush with the pilaster . . . rotary action latch is concealed. These exclusive ad-ntages make toilet compartments by Westeel the most odern in concept and the most functional.
Ask for full information.

NEW ROTARY CONCEALED LATCH



OUTSIDE OF DOOR — INSIDE OF DOOR

New 8800 Concealed Rotary Action Latch operates quietly and smoothly. It merges into the flush lines of the door, is simple to operate and is theftproof.



NEW INTEGRAL HINGE BRACKETS

New hinge brackets are completely concealed in the pilaster. Give uninterrupted streamlined sweep to the appearance of the door.

Improved, concealed bottom hinge (not illustrated) provides smooth, quiet action . . . longer life.

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INCA-LIGHTS "Silvaglo", high efficiency, single layer glass. 4 different shapes. 3 sizes. Pendant or Lev-R-Lok holder. Cat. Sect. 4-1

INCA-DOMES Inca-Lights topped with aluminum shallow rimmed domes. Finished in assorted colours, copper and brass. 3 sizes. Cat. Sect. 4-9



SPACE-LITES Recessed units, round and square. Frames in bone white, chrome, copper, brass. Corning, colouvered lens in black, coral, other colours. Cat. Sect. 4-2



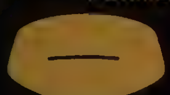
"CB" LIGHTS Die-cast aluminum wall and ceiling fixtures. Indoor or outdoor use. Spring-loaded safety thread, heat-proof gaskets. Thermopal glass. 3 models. Cat. Sect. 4-8



TRIM-LITE



FORMLITE

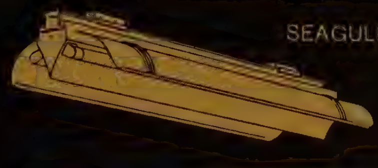


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These three surface-mounted fixtures, the TFH line, fit snugly to the ceiling—no bands or fastening devices. 3 thermal barriers prevent heat transfer. "Silvaglo" glassware provides excellent diffusing qualities. Electrical connections within enclosed metal boxes. Installed and removed without tools. Cat. Sect. 4-3

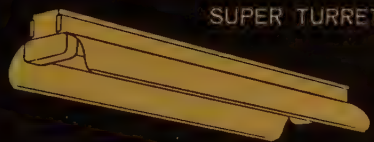
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SEAGULL 92.4% efficiency. Self-contained wiring channel. Rapid Start. H.O.R.S., Slimline, Power Groove, V.H.O. versions. Cat. Sect. 3-3



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SUPER TURRET Efficient unit for high intensity lighting. Slimline, R.S., H.O.R.S., Instant Start and Standard models. Baked white or porcelain enamel. Cat. Sect. 3-5

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CGC METAL STUD PARTITION: *six basic components, three versatile stud widths.*

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Architects: Hausner & Macsai

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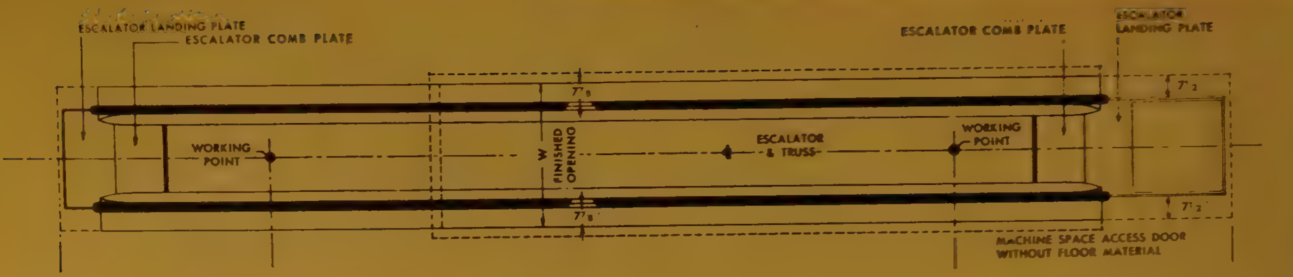
Canadian Gypsum Company, Ltd., Dept. RJ-3.
790 Bay St., Toronto 2, Ont.
Please send complete architectural information and details on the new METAL STUD PARTITION System!

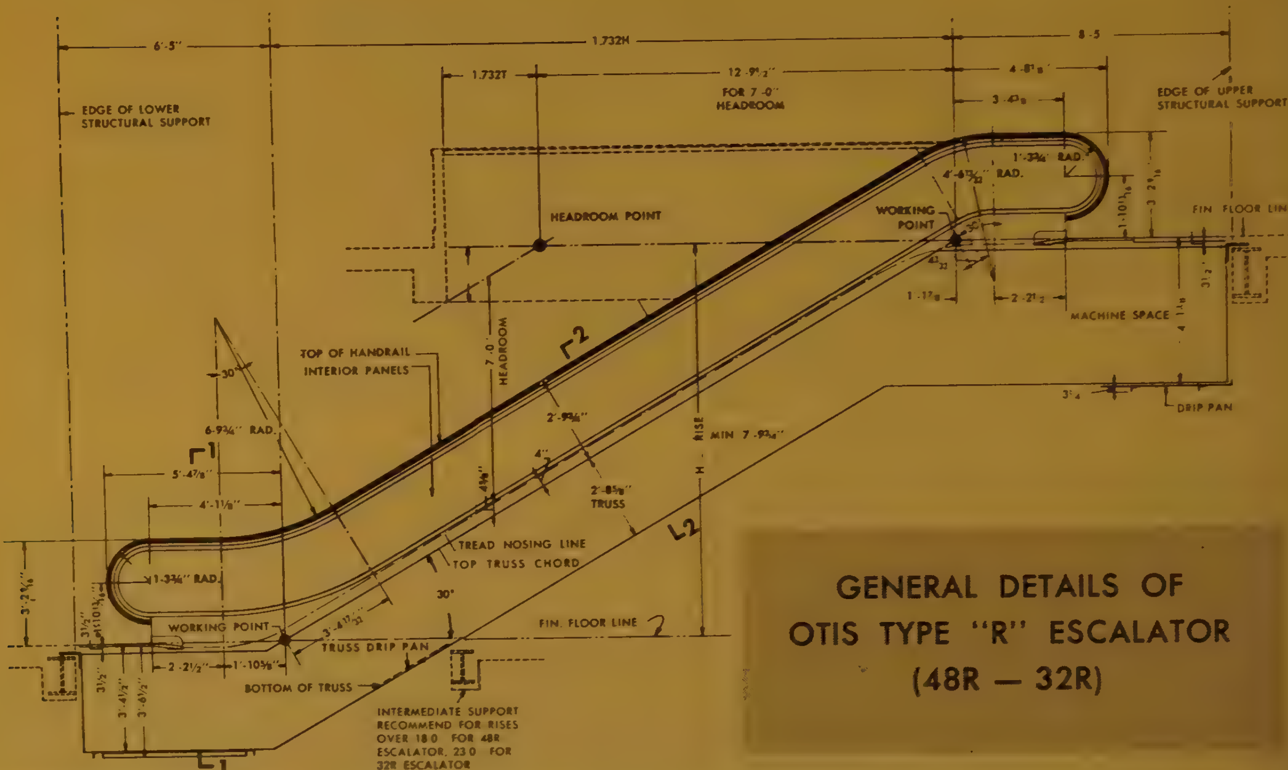
Name____________________

Company____________________

Address____________________

City__________ Province__________



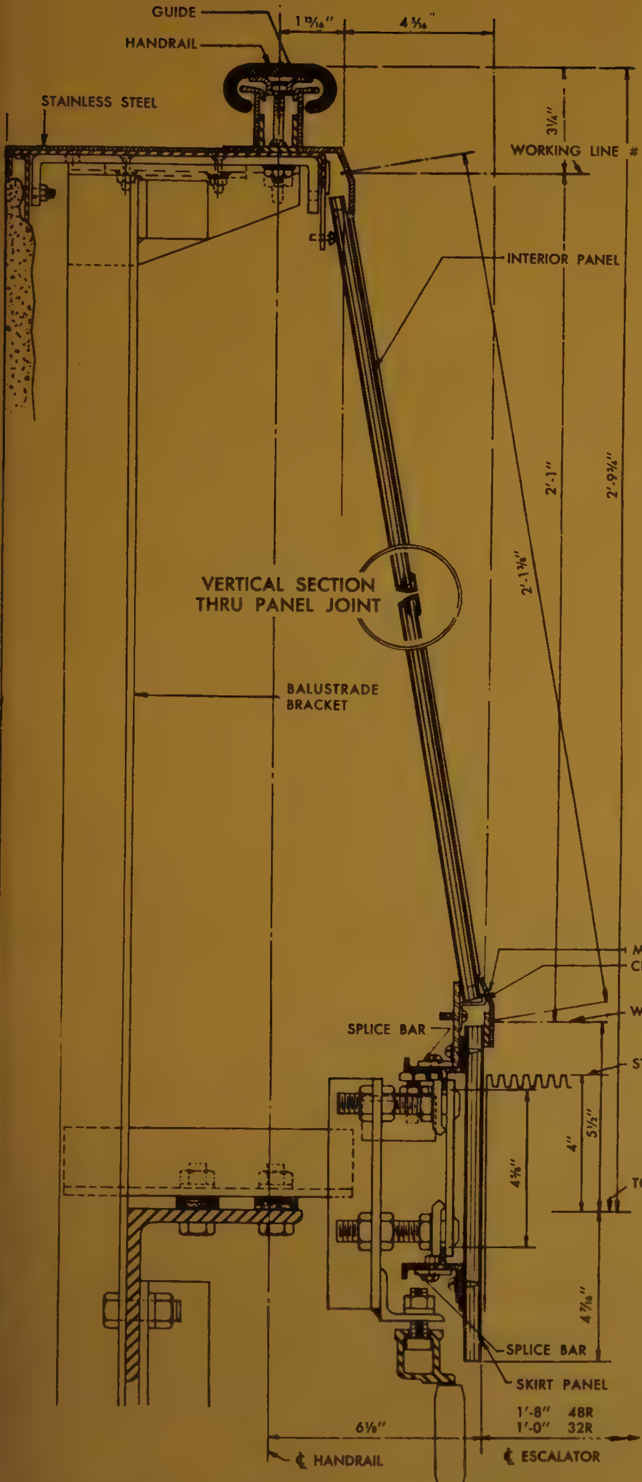


GENERAL DETAILS OF OTIS TYPE "R" ESCALATOR (48R — 32R)



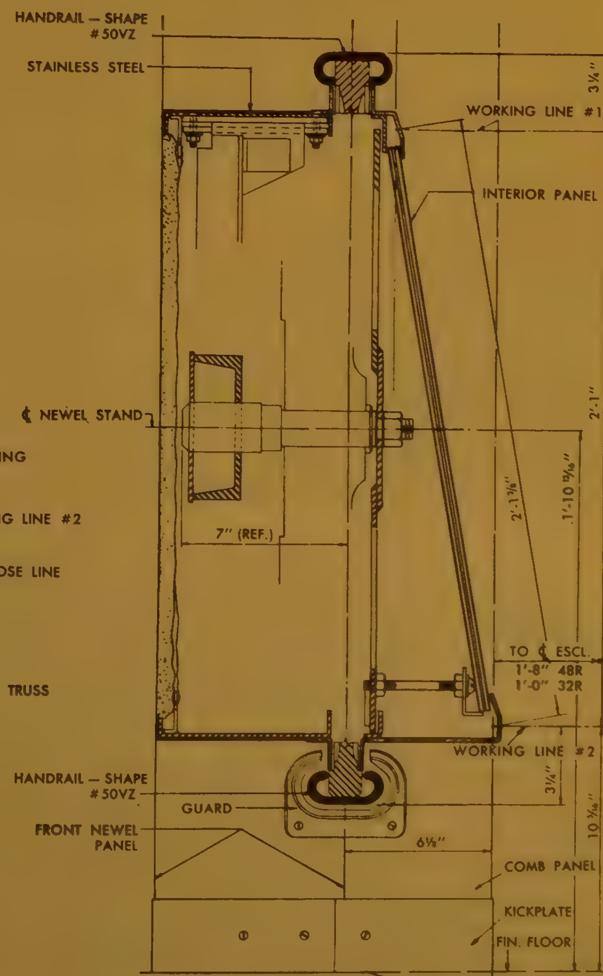


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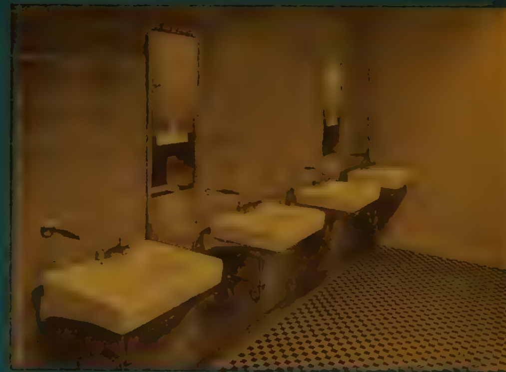
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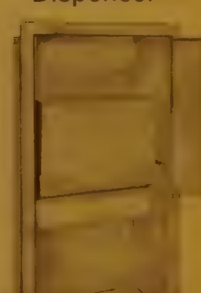
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*Reg. T.M.

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Clean, Silent, Room-Controlled ***ELECTRIC HEAT IS BASIC TO MOTEL OPERATION:*** Mr. Elmer Beiman, owner-manager of the Continental Motel on Highway #7 at Kitchener puts it this way: "I would recommend electric heat and the installation of electric cooking and water heating equipment to others in our line of business. Service with electricity is excellent and completely reliable. With hot water systems, the heating is often noisy. Air locks cause cut-offs and heat stoppages and are a darned nuisance. With electric heat, freedom from dust makes cleaning easier. The operation is simple and there are no maintenance problems. Costs compare favorably with other systems I have used." Complete electrical installation was handled by Wm. Roberts Electric, Kitchener. ***THREE-LEVEL STRUCTURE MAINTAINS ONE LEVEL OF HEATING COMFORT.*** Upstairs rooms as well as basement coffee shop at this motel can be room-controlled to individually desired comfort levels —conveniently . . . economically. ***ZONE CONTROL SYSTEM*** allows for maintaining slightly lower temperatures in hallways, etc. So the customer is greeted with special warmth and comfort as he enters the sleeping units. ***ADDED BEAUTY, COMFORT, CLEANLINESS*** of electric baseboard heating makes it ideal for unit decorating, maintenance and guest satisfaction. Wall treatments, lamps, drapes, bedspreads, carpeting keep clean much longer. And units have much more useable living space. ***BREAKFAST SERVICE FOR THE EARLY-BIRD TRAVELLERS*** is made quick, easy and efficient in the all-electric coffee shop. Cooking electrically for "short orders" is most economical. Always plenty of hot water, too, with fast, safe electricity.

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2060-5



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spotlights handrails in corridors and stairways . . . Incandescent recessed lighting provides added safety and decorative night lighting for:

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SERIAL 433, VOLUME 38,
NUMBER 9, SEPTEMBER, 1961

ROYAL ARCHITECTURAL INSTITUTE OF CANADA JOURNAL

THE OFFICIAL PUBLICATION OF THE
ROYAL ARCHITECTURAL INSTITUTE OF CANADA
PUBLISHED AT 600 EGLINTON AVENUE EAST,
TORONTO 12, TELEPHONE HU 7-4714.

Subscriptions: Canada, Commonwealth
and U.S. (12 issues) $7.00; foreign, $8.00

The Journal and the RAIC do not hold themselves responsible for opinions expressed by contributors.



The Sun Life Building
Architects: John B. Parkin Associates

Authorized as Second Class Mail,
Post office Department, Ottawa

CCAB Member of the Canadian
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Impermanence in the Modern Building

IN DISCUSSIONS on the evolution of design in the objects of daily use, we have yet to read of the fact played by obsolescence. Until the industrial revolution, there would appear to be no such thing except in matters of dress, and a little research would tell us whether the cut of the toga, its hemline or neckline ever changed, but it is unarguable that, from very early times, male and female vanity have made annual changes in dress de rigueur even in middle class society. In the eighteenth century, a gentleman was free to choose Chippendale or Sheraton furniture if he could afford it, but having made the purchase, he could settle down to a lifetime of use, and the prospect of its continued enjoyment even into the third and fourth generation. In larger matters, he would buy his carriage, his new Georgian house with the same feeling of investment, security and permanence.

How different it is today when mass production has superseded handicraft production, and our whole economy would seem to be based on obsolescence. Last year's radio or television set, or the motor car and refrigerator of five years ago may still serve us admirably, but all the resources of modern science in the field of communications are aimed at convincing us of their worthlessness, and the hardships which we inflict on our loved ones by their continued use.

In our cities, we watch a nomadic, propaganda ridden element in the population constantly moving from older to new apartment houses, newer homes and newer districts. Office buildings with a physical life of a hundred or more years are outmoded in thirty – churches, in Toronto, left stranded by the human tide that has moved on over greener fields, have often a brief second life as storage warehouses. Our older urban schools are disappearing, and, while as architects we can hardly condemn the change to brighter classrooms and gay interiors, it is a curious fact that, in our older university buildings in all countries, aging professors still climb dimly lit circular stairs to their rooms, and the classrooms of one hundred years ago are not thought unsuitable for students.

These thoughts occurred to us as we considered the requirements for the Fathers of Confederation Memorial Building in Charlottetown. There we have a building unique in our generation in that while its use is that of a cultural centre with libraries, museum, art gallery and theatre, its lifetime must be viewed in terms of centuries. The same conditions of longevity were set the architect in the design of the Jefferson Memorial, but his was the simple problem of durable materials well put together in an unchangeable architectural frame. The Charlottetown building poses a much more complicated problem – the problem of permanence coupled with maximum flexibility in the interior.

To keep his building a living memorial, the architect must look into the crystal ball and examine closely a long succession of new directions with new brooms. They will bless him for the possibility for internal change he made in his plan, or curse him for structural rigidity and resistance to change. It is a sobering thought for the competitor that, if Armageddon does not intervene, his building will still be functioning in Queen's Square, Charlottetown, P.E.I. halfway through the second Millennium.

L'impermanence de la Construction Moderne

ON PARLE BEAUCOUP DE L'EVOLUTION *de la forme des objets employés dans la vie courante mais jamais il n'est question de désuétude. Jusqu'à la révolution industrielle c'était, semble-t-il, chose inconnue, sauf dans le cas du vêtement. Il suffirait de consulter l'histoire pour savoir à quel point la coupe, la longueur et l'encolure de la toge variaient. Etant donné la vanité masculine et féminine, il est tout probable que, dès les premiers temps, certains changements annuels étaient de rigueur même dans les classes moyennes. Au 18e siècle, le gentilhomme en moyens pouvait choisir entre des meubles Chippendale ou Sheraton mais, l'achat effectué, il savait qu'il pourrait s'en servir pendant le reste de ses jours et ses héritiers après lui pendant trois ou quatre générations. S'agissait-il d'un achat plus considérable, comme celui d'un carrosse ou d'une maison de style georgien, il avait le même sentiment de faire une acquisition sûre et permanente.*

Il n'en va plus de même aujourd'hui. Depuis que la production en série a remplacé l'artisanat, notre économie tout entière semble fondée sur la désuétude. L'appareil de radio ou de télévision de l'an dernier, la voiture ou le réfrigérateur d'il y a cinq ans sont peut-être encore excellents mais toutes les ressources de la science moderne des communications sont mobilisés pour nous convaincre qu'il ne valent plus rien et qu'en les gardant nous sommes cruels envers les membres de notre entourage.

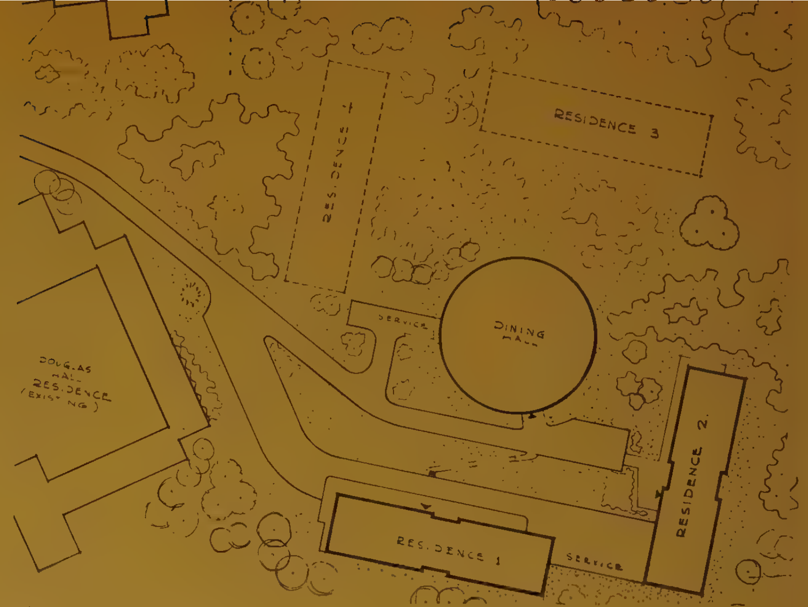
Dans nos villes, tout un élément nomade, victime de la propagande, se déplace continuellement vers des appartements, des maisons et des quartiers plus nouveaux. Des édifices à bureaux, construits pour un siècle ou plus, sont démodés au bout de trente ans. A Toronto, des églises laissées désertes par cette migration ont échappé provisoirement au démolisseur en étant transformées en entrepôts à marchandises. Nos écoles urbaines disparaissent. Un architecte aurait mauvaise grâce à condamner cette recherche de salles de classe mieux éclairées, aux couleurs intérieures plus gaies. Cependant, comment se fait-il que dans les vieilles universités de tous les pays, on voit encore des professeurs grisonnants monter de sombre escaliers tournants pour se rendre à des salles de classe plus que séculaires qui, pourtant, ne sont pas jugées indignes des étudiants?

Ces réflexions nous ont été inspirées par les exigences de l'Edifice commémoratif des Auteurs de la Confédération à Charlottetown. Là, nous avons un immeuble unique en son genre dans notre génération. Il s'agit d'un centre culturel, avec bibliothèques, musée, galerie d'art et théâtre, qui doit durer pendant des siècles. L'architecte a dû assurer la même durée dans les plans du Jefferson Memorial mais là il s'agissait simplement de réunir des matériaux durables dans une forme architecturale inchangeable. A Charlottetown, la problème est plus complexe; il faut assurer la permanence en même temps qu'un maximum de flexibilité intérieure.

Pour faire de cet immeuble un souvenir vivant, l'architecte doit d'efforcer de percer l'avenir et de prévoir une longue succession de changements. Les générations futures le béniront s'il permet une multiplicité de transformations intérieures ou le maudiront s'il établit une structure rigide, opposée à toute modification. Le concurrent malheureux peut se consoler à la pensée que, à moins de la fin du monde, cet immeuble sera encore employé sur le Queen's Square, à Charlottetown, au milieu du prochain millénaire.–E.R.A.

PROJECT





Dining Hall Building, McGill University, Montreal



Architects:
Durnford, Bolton, Chadwick & Ellwood, Montreal



SECOND-FLOOR PLAN

The dining hall will serve an ultimate group of four new residence buildings, three of which will be built now. The site slopes, and is a few minutes walk from the main centre of the University, bordering upon Mount Royal Park. As many as possible of the existing trees and features will be retained in order to maintain the park-like setting. Each residence will house approximately 220-230 students. Consequently the dining hall building is planned with four separate dining rooms, one serving each residence. With the use of folding partitions, these rooms may be used separately or in conjunction for function.

Planning of access and service to four separate dining rooms, without duplication of service areas, was solved by adopting the circular arrangement with a central service core. Stairs and cafeteria line-up are combined for each pair of dining rooms. In and out traffic is segregated in each room. At the main entrance side the building is a full two storeys above ground. At the opposite side of the circle, the lower floor becomes a full basement as the ground level rises considerably towards the third residence. Mechanical equipment is located in a circular penthouse over the service core.

The lower floor is faced with rubble stone. The dining room level is largely glass with ceramic tile facing to the spandrel and fascia. The structural frame is reinforced concrete. Foundations are on solid rock.

THE SUN LIFE BUILDING

Architects & Engineers: John B. Parkin Associates
Architectural Consultant: A. J. C. Paine, PPRAIC



The Sun Life Building

TORONTO **ONTARIO**



FACTS ABOUT THE BUILDING

FOURTEEN office floors.

Two penthouse floors for ventilation and elevator overhead equipment.

SIX basement floors, including a four-level parking garage with space for 133 cars: at the rate of one space per 1,000 sq. ft. of rentable office area.

HEIGHT: 215 feet above ground level.

DEPTH: 69 feet below ground level — 21 feet below the level of Lake Ontario.

TOTAL Floor Area: 276,150 sq. ft.

LAND occupied by the building: 132 feet by 96 feet.

STRUCTURAL Material: Total weight is 26,000 tons.

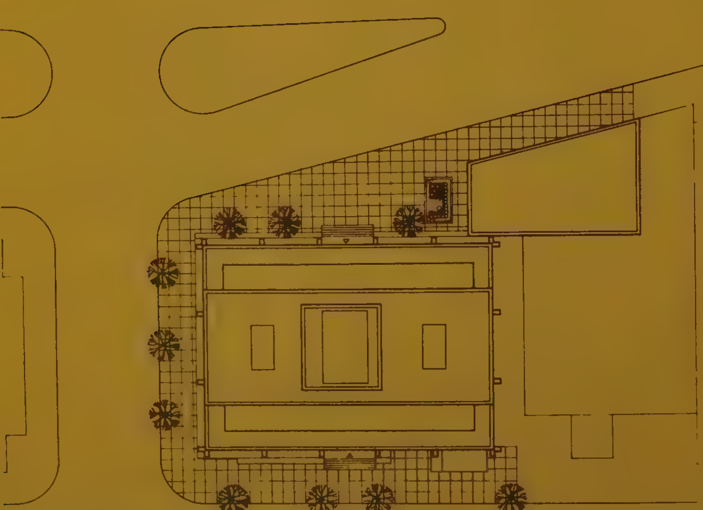
SURFACE of the building is all glass and anodized aluminum. Anodized aluminum differs from ordinary aluminum in the electro-chemical treatment of its surface, giving it a non-tarnishing coating. Anodizing is eight-ten-thousands of an inch thick. Glass surface is 58,800 sq. ft.

FLOORS: Pure vinyl floor tiles; granite floors in the lobby.

CEILINGS: Perforated metal pan acoustic ceilings; lobby ceilings have gold anodized aluminum louvred panels.

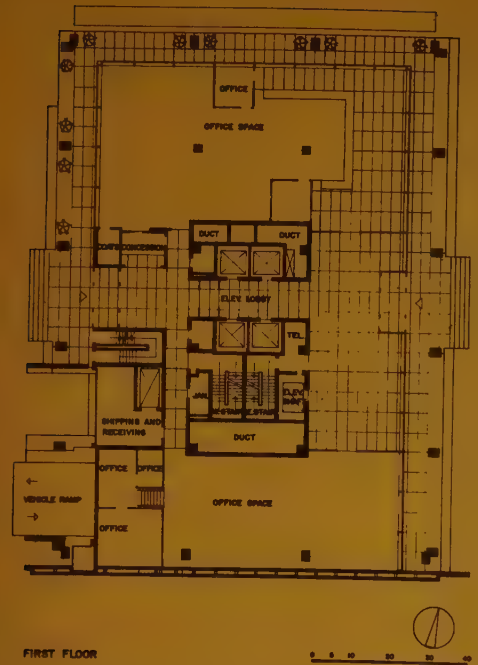
POTENTIAL population of building: 1,450.

A BRANCH of the Bank of Montreal is on the ground floor level.

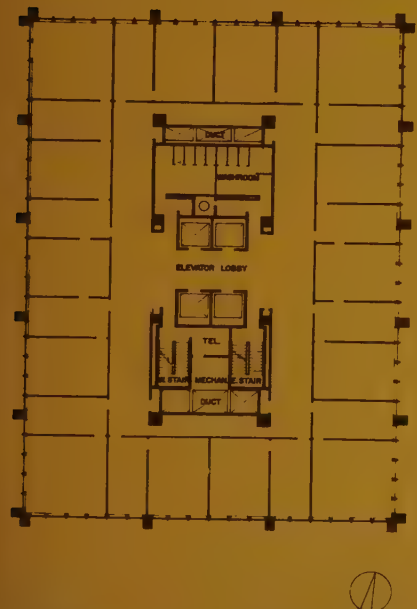








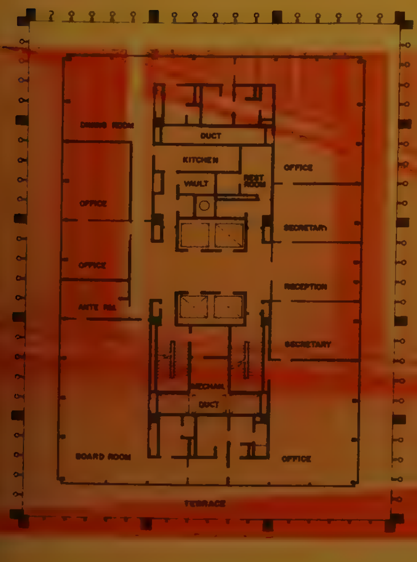
FIRST FLOOR



TYPICAL FLOOR







FOURTEENTH FLOOR

Architects and Engineers: *John B. Parkin Associates*
Architectural Consultant: *A. J. C. Paine, PPRAIC*
Partner in charge of Design: *John C. Parkin*

Associates: *Design — L. S. Laity, Douglas C. Rowland; Interior Designer — John Gallop; Landscape Designer — Richard Strong; Associate in charge of Structural Engineering — R. F. Marshall; Substructure, Chief Structural Engineer—J. Ozdowski; Superstructure —H. E. H. Roy; Associate in charge of Mechanical Engineering—J. E. Mews; Chief Electrical Engineer — S. D. Hughes; Project Architects —M. J. Miller, J. A. Rutherford; Project Supervisor—J. K. Young.*

Consultants: Foundations: *Moran, Mueser, Proctor & Rutledge*

Mechanical: *Jaros, Baum & Bolles;* Lighting: *Richard Kelly*

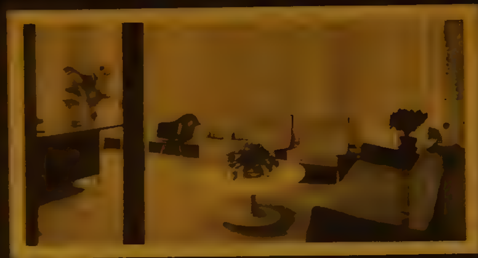
Acoustics: *V. L. Henderson;* General Contractor *Perini Limited*

Photography by Panda



SUN LIFE

BUILDING

















THE BUILDING

The Sun Life Building is a curtain wall tower structure. The weight of the building is supported by columns within a central core, and by exposed perimeter columns clad in aluminum. The entire exterior is glass and aluminum. The entire exterior is glass and aluminum, and its simple, straightforward lines give the impression of lightness, yet strength.

The central core, housing all services, ducts and washrooms, is entirely surrounded by office space free of supporting columns. All office space is within 30 feet of the windows, assuring excellent natural lighting throughout.

The building has 14 office floors, two penthouse floors, and six levels below ground. The Sun Life is occupying office space on seven floors. Most of the material used in the construction of the building was made or processed in Canada.

PARKING

Four of the six basement levels are garage space with accommodation for 133 cars. This basement garage is directly connected to the lobby by special elevator service.

THE LOBBY FLOOR

The lobby floor is bright and spacious. The Company's general office and records are maintained at the north and south sides of this floor, while the reception area occupies the central portion.

A sculpture of the sun by the well-known Canadian sculptor, Louis Archambault, dominates the floor at the entrance to the elevators. This arresting interpretation in bronze, called Sunburst, weighs 3,000 pounds and is eight feet high by nine wide.

A plaque commemorating the opening of the building is in the reception area off University Avenue. The plaque takes the place of a cornerstone and behind it have been placed items of Company historical interest. These include a brief history of the Company, a list of agents and staff currently on strength, a policy form, copies of the Toronto newspapers and some Company publications.

LIGHTING AND AIRCONDITIONING

The area of the glass surface on the walls of the building is 58,800 square feet. The airconditioning system, located around the perimeter on each floor, controls sun heat loads by removing the heat right at the glass. The system allows individual settings for personal preference and has been designed to permit flexibility to suit partition changes. The interior zone of each floor also has an individual temperature and humidity control. Overall, the system ensures that temperatures are kept at a proper level throughout the building at all times. Electrostatic filters in the airconditioning system remove dust and other impurities from the air.

Sky glare can be controlled by vertical aluminum Venetian blinds which can be set to block the direct rays of the sun without having to be closed completely.

ELEVATORS

Four electronically operated elevators with speeds of 500 feet per minute provide the building with fast service. Another elevator serves the basement parking floors and there is also a special freight elevator.

STAFF AREAS

Special staff areas—lunchroom and lounges—are provided on the second floor. The lunchroom accommodates 60 at one time. The bright decor and informal surroundings make these areas attractive for the comfort and pleasure of the staff.

PENTHOUSE

The airconditioning and elevator overhead equipment is housed in the penthouse. This equipment weighs more than 30,000 pounds. The hoisting of it to the top of the building required a 230-foot crane, the highest lift of this kind ever undertaken in Canada.





Above: North and East Elevations by night

Left: The Lobby, looking north along University Avenue

WINDOW WASHING EQUIPMENT

Of special interest is the window washing apparatus, designed to clean the exterior of the building quickly and efficiently. The equipment is assembled so that operators work from staging platforms which move up and down the building mechanically. One man can clean at the rate of 750 square feet of surface per hour, and the entire building can be cleaned by two men in ten working days. This is the first such installation in Toronto.





Left and above: SUN LIFE Branch Manager's Office

Below: The Main Lobby





HERB NOTT



SUN LIFE Toronto Renewal Office, Main Floor



SUN LIFE Typical Branch Office Reception



SUN LIFE 1st Floor, North Wing, General Office



MASSEY-FERGUSON, Private Office

LANDSCAPING AND ILLUMINATION

The University Avenue front of the building will be landscaped with trees and flower beds. Flowers will be changed from time to time during the year to provide colour and bloom from spring to autumn.

The location of the building at the bend in University Avenue at Richmond Street gives it a commanding view of the entire avenue. Illuminated at night, the building will be a tower of light in the heart of downtown Toronto.





SUNBURST

The Sunburst by sculptor Louis Archambault, is the main feature in the Lobby of the Sun Life Building.

Weighing 3,000 lbs and measuring 8′ high by 9′ wide, the Sunburst was cast in bronze from resin patterns.

The final design was converted into a full-size master plan from which the precise outlines were pegged out on a table, using small nails to determine the exact level of the clay. Only half the sculpture was thus modelled, as the Sunburst is symmetrical. A resin pattern was taken from the clay, and this in turn was used for casting the two halves in bronze.

Louis Archambault is a graduate of Jean de Breboeuf College, and studied at the Ecole des Beaux-Arts in Montreal. In 1958 he was awarded the RAIC Allied Arts Medal, and has won a Canadian Government Overseas Award and a Canada Council Special Award.









Private Office, Aluminum Co. of Canada Ltd.





LIGHTING

The lighting of a typical office floor consists of one two lamp, one foot by four foot, recessed fluorescent troffer per 5′ 2″ x 5′ 2″ module, to give a maintained lighting level of 80 foot candles. The diffuser for the fixtures is Corning No. 70 glass, housed in a one piece frame with no exposed catches or hinges. This one piece frame, ½ inch in width is the only visible metal seen from below.

The lighting on the first floor consists of a luminous ceiling. The ceiling elements are one inch by one inch gold anodized louvres suspended on gold anodized inverted T-bar members on the 5′ 2″ x 5′ 2″ module lines. The blades of the louvres in one direction are slightly tilted alternately off the vertical. This feature results in the ceiling having a pleasing "textured" look. The lighting is supplied by continuous rows of fluorescent lamps on 18 inch centres mounted approximately 16 inches above the louvres to give a maintained lighting level of 70 foot candles. The first floor also has supplementary incandescent lighting around the central core to highlight the travertine walls. This lighting consists of 75 watt PAR lamps on 9 inch centres housed in special elliptical reflectors which in turn are mounted in a slot above the ceiling so that the lights are not visible from the normal viewing angle.

PARTITIONS

The six basic types of demountable partition are all floor to ceiling height in 5 ft. widths surrounded by a 2″ strip. This strip is repeated in the floor and ceiling, completing the 5′ 2″ module. The partition units are interchangeable with the strip in all positions except adjacent to the window wall where provision has been made to accommodate the air conditioning induction unit.

For maximum sound insulation a sound reduction factor of 40 decibels is obtainable. The partitions are finished in a range of seven colors with a ¾″ black baked enamel trim throughout. Where a partition is glazed, this trim also serves as a glazing bead.

The ceiling channel, post and base are 2″ deep, but the thickness of the partition is 3″. The ½″ difference in plane on both sides of the partition is made up of a clear anodized aluminum snap-on extrusion which is removeable for access to connections, wiring, etc. Switches and thermostats are housed within the 2″ post.

STRUCTURAL

The foundations of the Sun Life Building are possibly the deepest in the Toronto area. At its low point the sixth parking floor is twenty-one feet below the level of Lake Ontario and sixty-eight feet below ground level. The six basement floors include a four level parking garage and mechanical rooms.

This is the largest basement garage in a commercial building in the Toronto area. The depth of the garage is a direct function of the by-law requirements and the area of the site.

For some time the Structural Department of Parkin Associates had been searching for a concrete floor which could be used for long spans and eliminate large deflections. As an answer, a two-way waffle slab was used on all parking floors, producing a very rigid structure. Specially produced forming pans of polyester resin reinforced with fiberglass produced a high quality of concrete finish suitable for an exposed ceiling. It may be claimed that due to this shallow floor structure depth one additional floor was gained within the same excavation.

The superstructure of the building consists of a welded steel space frame supporting pre-cast concrete cellular floor slabs. The open plan for the offices and the nature of the curtain wall, which restricted the use of bracing members, led to the decision to use this three-dimensional rigid frame. It is common practice to provide bents in one direction only, since most buildings are rectangular in plan and wind forces are critical in the narrow direction only. In the Sun Life Building, almost square in plan, the wind forces and the resulting moments become critical in both directions.

The rigid frame analysis provides a saving of about 35% of the beam section modulus over a more approximate method of analysis. This results in a saving of about 20% in the weight of structural members.

Continuous design permitted the use of smaller beams, allowing the mechanical ducts to pass under the structural members, an important consideration in a multi-storey building. Direct connection of beams to columns was used with welds of the same size as the beam flange and thus reaching the ultimate in efficiency.

To a great extent, the industrialization of our steel fabricators has permitted us to design steel box columns which, in continuous design, are heavier as the moments induced increase. Good results have been achieved using different welding procedures, varying the speed of travel on automatic welding equipment and varying the type and size of electrode. By balancing the shrinkage forces through welding sequence and weld placement, final distortion was reduced to zero.

The Sun Life Building is an example of the progress made in the last decade in fully welded multi-storey structures. Experience has indicated that a high standard of design facilitates the erection of structural materials.



Above: 17th February, 1961

Below: 24th September, 1959



MECHANICAL

The keynote of the design of the new Sun Life Assurance Company office building in Toronto is to supply the absolute maximum in flexibility in order to provide ideal office space for almost any possible occupancy.

Towards this end the building was designed on a modular basis with movable partitions and with a complete underfloor system of electrical services.

The air conditioning system devised to meet this requirement incorporates a high pressure perimeter induction unit system and an individual interior supply system for each floor.

The normal problems encountered in air conditioning the perimeter office areas of sealed buildings were accentuated in the case of the Sun Life Building because the tower is approximately 70% glass. In addition, double glazing has been employed in order that close control of winter humidification can be maintained without condensation forming on the glass. The double glazing materially reduces the heating load of the building and produces a slight decrease in the instantaneous cooling load. It has a detrimental effect however in that it lengthens the season during which mechanical cooling must be employed and tends to emphasize fluctuations in solar heat load as each building elevation is exposed to the sun.

To avoid operating problems from these potential sources, four separate induction systems have been provided, one serving each exposure. The controlled temperature of both primary air and secondary water of each zone can be reset by the building engineer from a centrally located control panel, thus providing optimum conditions at all times. It is also possible to change over each system separately to the winter cycle of operation. This permits economical operation. Summer cycle operation in the cooler weather is expensive since the systems are so scheduled that hot air at a maximum temperature and chilled water at a minimum temperature are provided simultaneously.

The supply units in the building are housed in specially designed continuous enclosures. These enclosures are less than 12″ in height on the second to thirteenth floors and less than 2″ on the fourteenth floor. Thus there is a minimum obstruction of the panoramic view.

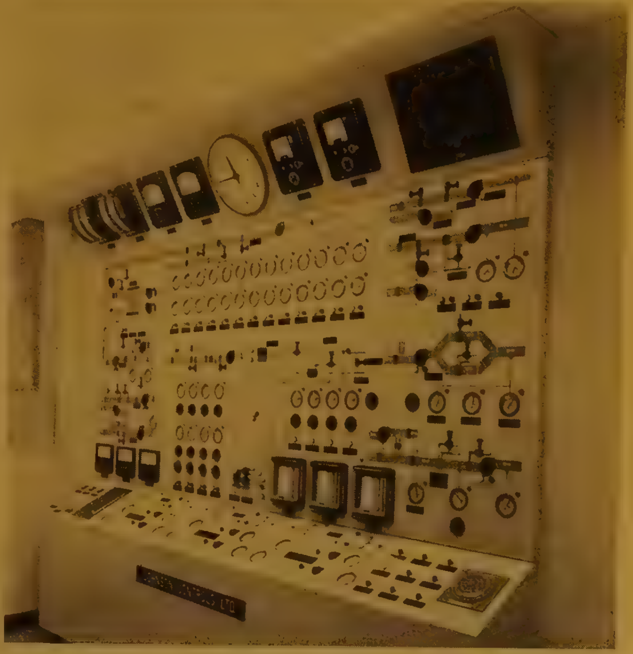
Air conditioning of the interior space does not present the same difficulties as those of the perimeter area. Wide fluctuations in loading are unlikely. It was decided therefore to control the conditions by providing a separate air conditioning unit on each floor. These incorporate a cooling coil, a reheat coil and a humidifying spray and are controlled from carefully located space thermostats and humidostats, one of each per floor.

The supply air to these units is filtered and preheated as required in a large central system in the penthouse. The main fan supplying this air to the individual units is provided with an automatically operated inlet vane control which controls the total quantity of air supplied in order that during nights and weekends only those floors which are occupied need be supplied with conditioned air.

Each five foot square module in the tower floors is provided with a one foot wide fluorescent light fixture and ten 12″ x 24″ metal ceiling tiles. Interior air is supplied through 12″ x 24″ perforated type diffusers which replace the ceiling tiles as required. T-bar type ceiling supports are employed; thus this change from tile to diffuser can be made with a minimum of difficulty. The diffusers are connected by 8″ round flexible duct to the network of supply air duct work located in the ceiling space.

The return air grilles are of the same design as the supply diffusers and are located in the place of ceiling tiles. These are not ducted but exhaust directly into the ceiling space which functions as a return air plenum.

The central automatic control panel is located in the engineers office in the second basement. This panel incorporates starting controls for all of the air conditioning systems throughout the building, schematic diagrams of the various systems, pilot lights, alarms and remote reading thermometers which indicate all critical temperatures. From this panel the overall operation can be closely monitored and ideal conditions maintained throughout the building at all times.



Above: The control panel

Below: MASSEY-FERGUSON, Executive dining room





ALUMINUM CO. OF CANADA LTD., Private Office

THE ALUMINUM COMPANY OF CANADA occupies the tenth floor of the Sun Life Building. The screen shown here was designed and built under the supervision of Montreal Architect, Norman Slater.

The screen is a feature of the reception Lobby and measures approximately 8 ft. 6 in. by 10 ft. consisting of 880 pieces of natural anodized aluminum each measuring 5 inches by 8 inches. Alcan No. 3 anodizing sheet, mill finish, was used for the overlapping fins which were brake formed. Twenty-five percent of the anodized fins were brightened to achieve some highlighting. The fins were blind riveted to the black enamelled supporting members.



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SUN LIFE BUILDING

The Use of Test Buildings in Building Research

Research and testing to provide reliable information about buildings and their components and materials is continuing in industry, the building research stations, and in other places in many countries around the world. As organized research and testing this is a relatively new development.

Even so, one might think that many of the outstanding questions should now be answered. Some of them are but the speed at which new problems arise causes architects, perhaps impatiently, to consider the provision of additional independent facilities. A motion to this effect was discussed last year by the OAA.

While interest and effort in this field is always to be welcomed, experienced research workers are cautious, and sometimes skeptical about the proposals of laymen. Information through testing and research is needed but it is not so simple as one might suppose to wrest useful information from a building or its parts.

Test structures are well known as one of the research workers weapons. This is a dramatic technique having great appeal. The attached paper is about this method. It is a frank and interesting account of its possibility and limitations. By its publication in the Journal it may incite intelligent criticism, and interest and support for continued and increased research in the building field.

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Many people conceive of a building research program as requiring full-scale test buildings, specially designed and instrumented for experimental purposes. In the housing field particularly, the concept of the "research house" appeals to the layman. He is likely to regard this as being at once the minimum and the maximum experiment required to prove a point. He is unlikely to differentiate between the use of an individual house, incorporating a variety of new materials and ideas, and the more realistic use of groups of houses incorporating certain specific variations. The common view appears to be that investigation of actual houses under actual conditions is a useful method of obtaining practical answers in a short period of time.

The scientist has never found this approach fully acceptable, preferring to conduct laboratory experiments under controlled conditions, followed by field application and observation. This apparent obsession of the scientist with controlled experiment is often difficult for the layman to understand, particularly in such a practical field as building. This paper suggests reasons for this attitude and discusses the philosophy of test buildings on the basis of experience gained in the building research field over the past ten years. Particular reference will be made to the Canadian use of test buildings and to the approach followed by the Division of Building Research of the National Research Council in the use of small test huts.

Test on Full-Scale Houses

A full-scale house is, by itself, a complex arrangement of materials and components that can be described accurately only by means of a set of fairly detailed plans and specifications. The possible differences that may exist between houses, in materials, structural details, window arrangements, over-all shape and size, to name but a few variables, are almost without limit. Some of these differences may have little or no influence on the particular performance features to be investigated, but even if some facts can be established in this way, the number of features having possible influence on the result to be studied will still be large.

The variables inherent in house construction are only part of the problem; the complex effects of the exterior environment must also be considered. Wind, temperature, humidity, radiation, precipitation, and other factors that make up the weather, are all uncontrolled variables, acting sometimes separately and sometimes in combination. Some features of house performance may be related to one particular factor, but more often the combined effects of two or three factors are significant. Daily average values of outside temperature, for example, may represent a primary variable in one instance, but if freeze-thaw action is involved the related fluctuations of temperature and solar radiation become important. On the one hand the transient behaviour of weather factors may affect performance; in other cases the cyclical aspects over longer intervals may be the important influence. Even annual weather cycles may change significantly at any one location, requiring a study to be continued over a period of several years. The weather thus not only increases the number of variables involved, but may introduce a time factor which requires that the duration of studies on actual buildings be extended to cover long periods, with corresponding increased cost.

There is yet another characteristic of full-scale house testing that complicates the situation, the question of occupancy. Occupants are normally necessary, both to simulate the actual case and for economic reasons. Although it is conceivable that the influence of the occupants on the interior environment could be duplicated artificially for certain studies, to do so in all other respects would be difficult and costly. Certainly from the economic point of view, the use of unoccupied houses in large numbers can seldom be justified. In any case, the variables introduced must still be contended with and in the majority of cases using real occupants, the differences between the various families involved must be recognized.

Two examples will serve to illustrate the marked influence which differences in the habits of occupants can have on studies in actual houses. An attempt to compare the summer comfort conditions in two occupied houses of widely different constructions failed because the differences attributable to the houses themselves were effectively masked by the uncontrolled opening and closing of windows. In another case two houses were fitted with aluminum windows and frames on an experimental basis and were to be observed over one winter. The tenants in one house reported no difficulties with

Fig. 1. One of the early test huts at Trondheim, Norway.



the windows. They did, however, ventilate the house extensively by opening windows, and dried all washing outdoors, so that the indoor humidity in winter was so low as to cause no condensation on the aluminum frames. The tenants in the second house said the windows were satisfactory but on examination after a period of cold weather a coating of as much as one inch of ice had accumulated on the warm side of the window sills, a condition that would have been quite unacceptable to many tenants. These tenants never opened windows in winter and dried washing indoors, thus maintaining a high moisture condition in the house.

Very few planned, large-scale house performance studies have been carried out in Canada. There have been, and probably will continue to be, studies on groups of a few "experimental" houses designed to demonstrate or evaluate some specific characteristics, but the results from such experiments are often of limited value. This approach was tried initially by the Division of Building Research in its early formative years, before its laboratory and other research facilities were available.

Two similar houses were built in 1947 at the Montreal Road site, as part of a staff rental housing program. These houses incorporated a variety of new materials and equipment, as well as involving one or two departures from conventional structural features. The observations made and the reports of the tenants were interesting and informative, but any conclusions that could be drawn had very limited application. Many of the features could have been studied to greater advantage in the laboratory had such facilities been available at the time. Perhaps the most significant results were to be found in the experience gained by the research workers involved.

On rare occasions an opportunity is provided in which the number of variables within a group of buildings may be reduced so as to make possible a designed experiment with a small number of samples. When such situations are recognized by interested people, useful results may be obtained with a minimum of expense. A notable example in Canada was the work of F. L. Lawton at Arvida, Quebec, in 1930 to 1935.[1,2] The main study conducted by Lawton involved eight houses of identical plan and construction in which different insulation arrangements were employed. The houses were electrically heated, with the energy input metered accurately; the householders were co-operative to the extent of maintaining records of interior conditions. The nature of the experiment permitted the author to draw some fairly definite conclusions regarding the comparative thermal performance of the houses and to relate these to previous, less complete, investigations in a roughly quantitative manner. Even with close similarities within a group of houses, however, there were still a great many variable factors to complicate the analysis.



Fig. 2. Outdoor test station at Saskatoon showing the service building, six wood-frame test huts constructed over a service tunnel, and a standard hut on the left.

The need for statistically sound evidence from a large number of houses, under the wide range of climatic conditions and with the large number of variables to be contended with, is normally recognized by manufacturers of building products. Development departments in such organizations are continually producing new materials that must be tested to determine their suitability for use in houses across Canada. These products are tried out on a field basis in as many cases as the manufacturer can afford. When their performance has been tentatively established, they are released for sale. They therefore come to be used in a large number of houses across the country with their expected performance being confirmed or questioned through the medium of reports to the supplier. The manufacturer inevitably experiments to some degree with his customers in this way, using the information he gains to improve the performance of his product in future production.

This is the only economic method that he can utilize for no matter how much money is available for testing, it is not enough to enable him to cover all conditions to which his product will be exposed. The manufacturer's problem is really the same as the research worker's problem — he must do what it is possible to do, having in mind the requirements of the situation. The manufacturer, like the researcher, utilizes the scientific method. Observations of the performance of the product, isolation of the factors causing the effect, the development of hypothesis explaining the effect, and subsequent testing to confirm the hypothesis, summarises the procedure followed. The objective is accurate prediction of performance, achieved through synthesis of the available information and experience.

The Use of Small Test Huts

Apart from the broad, all-inclusive field observation approach used by the manufacturer and the costly, planned statistical study of groups of experimental houses, there is another research technique that has been used with considerable success. This method involves the use of small, simple test buildings exposed to actual weather conditions. It has been used occasionally in studies of the thermal and moisture performanc of building sections in North America and in the Scandinavian countries.

The first use of small test buildings for thermal studies on walls occurred in Canada in the period from 1920 to 1925, and in Norway at about the same time. Professor A. R. Greig, at the University of Saskatchewan in Saskatoon[3] compared the heating requirements of several huts of identical size, constructed of different materials. Initial measurements of electrical heat input were made, with interior conditions under manual control, but the following year automatic control was utilized. Because of the simplicity of the hut construction, not only were relative thermal values obtained but reasonable estimates of thermal co-efficients of walls were possible.

Dr Andreas Bugge[4] utilized the same basic approach at Trondheim, Norway (Fig. 1), with over 27 test huts of different construction. He later employed a technique similar in principle to the guarded hot box, which permitted the evaluation of the thermal properties of individual walls or roofs in these test structures.

Small test huts have the obvious advantage over full-scale test buildings of low cost, permitting a much larger number of units to be considered in an experiment. They need not conform to any particular shape or configuration, and may be as simple in construction as is possible while still in keeping with the design of the experiment. The variables associated with occupancy are eliminated and the restrictions imposed by the safety and health requirements of building codes are not applicable. Changes in construction features are more readily made to suit the changing

demands of the experiment. Simpler structures permit simpler instrumentation. Measurement of mass and energy flow are more readily obtained and can be more easily analyzed than in complex, occupied buildings. Simpler, standardized shapes may considerably reduce the complications associated with wind and other weather phenomena.

Studies involving variations in construction, where the behaviour of individual panels under predictable exposure conditions alone is of interest, may be adequately handled in multi-panel test buildings. The test building in this case can be a simple single structure with exterior walls, roof, or floor, made up of different components or combinations of materials. The various panels are subjected to the same indoor and outdoor environment when similarly orientated and direct comparison becomes possible. Certain advantages of the "separate hut" approach in the heat and moisture flow aspect are lost, but a great deal is gained by the ease of panel removal for observation and measurement. The multiple panel test building has been used very successfully in the United States, notably at Pennsylvania State College and at the National Bureau of Standards. The method has particular advantages in the moisture performance field, representing a materials exposure approach, the test building serving only as an enclosure in which representative conditions may be maintained.

The smaller test huts are not without their disadvantages and limitations. Important characteristics of the simulated full-scale buildings are lost in size reduction. Aerodynamic simulation is impossible under actual conditions and over-all thermal and moisture storage capacity cannot be duplicated. In many fields the small test building is entirely unsuitable, such as in heating system performance studies, structural testing, foundation performance, and architectural planning, to name a few. In the materials field, however, particularly in the performance of building enclosures, the test hut has great potential, the basic problems with the method being in the selection of exposure conditions, internal and external, and in the instrumentation and processing of results.

The Use of Test Huts by the Division of Building Research

Test huts for studies in the field of thermal performance of walls were first erected by the Division of Building Research in 1950 in Ottawa and Saskatoon. At that time the Division had no laboratory facilities for thermal testing of walls and there was need for some information on the performance of newly developed materials and wall designs. In Ontario, insulated masonry construction was being proposed, and in the Prairie Provinces various new types of insulation and insulation arrangement for wood-frame construction were being introduced.

Preliminary planning for a test hut installation had been underway at Saskatoon by the University of Saskatchewan. This work led to the establishment of the Prairie Regional Station of the Division in Saskatoon, and the design and construction of an Outdoor Test Station on the campus of the university there (Fig. 2). This outdoor test facility provided an underground tunnel to permit access to six individual test huts from below (Fig. 3).

The thinking of the Saskatoon group influenced the design of the huts in Ottawa in so far as instrumentation and basic design were concerned. The huts were heated electrically to maintain constant interior air temperatures, with air circulation maintained using a fan. Initially, control of temperature only was employed, but in subsequent studies controlled humidification was added. In all cases the total energy input was measured on a daily basis and became the primary parameter of performance.

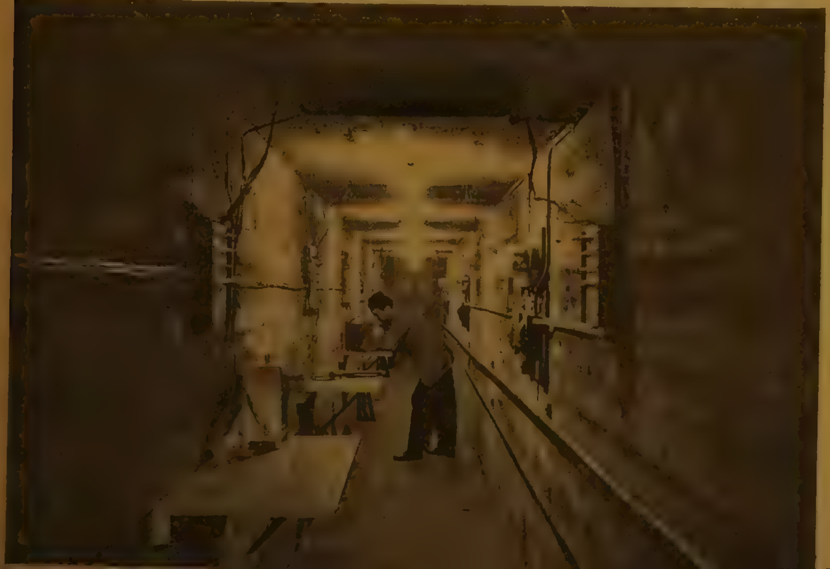
The Ottawa huts, involving unit masonry walls and incorporating variations having more significance from the moisture point of view, came to be regarded with somewhat different emphasis than those in Saskatoon. The influence of rain water absorption by masonry, coupled with the temperature-induced migration of moisture, led to studies which overshadowed the original relative thermal performance concept. The Ottawa huts came to be regarded, quite naturally, as providing a means for exposure of walls to the climatic conditions of Central Canada.

The Saskatoon installation had been specifically designed for thermal performance studies of variously insulated wood-frame walls. It had been anticipated that, in addition to over-all thermal comparison between huts, correlations between heating requirements per unit temperature difference and wind velocity, as well as solar radiation, would be attempted. The north and south walls of each hut were also well instrumented for temperature and moisture content measurement in preparation for studies of transient conditions and solar radiation effects.

Enthusiasm for the test hut approach within the Division led to another development, that of using a "standard hut" as a type of calorimeter to be used in establishing climatic differences between various regions (Fig. 4). The thought was that the heat input to the test hut would be a measure of the combined effects of wind, outside temperature and solar gain on a small structure and, as such, would be indicative of the heating requirements for a particular area. Four such standard huts were erected, one at Saskatoon, Fort Churchill, Manitoba, Ottawa and State College, Pennsylvania. These huts were of insulated frame construction raised above grade level on a light metal stand, and heated electrically to maintain a constant inside air temperature (Figs. 2 and 4).

A useful comparison of the huts at Fort Churchill and Saskatoon was made during the first year of operation in 1951, and interest was stimulated by the correlation found of heat input with wind velocity. A similar analysis of records from the six Saskatoon huts was undertaken but yielded rather disturbing results. It became apparent that the Saskatoon-Churchill hut agreement was largely fortuitous, and that the effects of variable air leakage between

Fig. 3. View of the tunnel at Saskatoon providing access and services to the test huts above. Readings of thermocouples, power inputs and other instrumentation can be taken in the tunnel without disturbing the hut conditions.



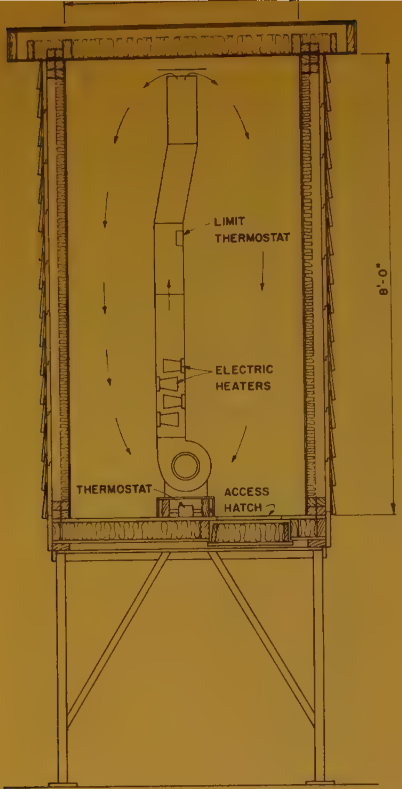


Fig. 4. Cross-section of the standard hut of the type exposed at Saskatoon, Churchill, Pennsylvania State College, and Ottawa.

huts made useful comparison quite difficult. Correlation of daily heating requirements with wind velocity showed not only discrepancies between huts, but for the same hut from season to season. Disturbing though this was, the magnitude of the effect on average seasonal values for the individual huts was small.

Attempts were made to determine the air leakage characteristics of the huts directly, using a pressurization technique, and later employing tracer gas methods. These tests, admittedly incomplete, failed to establish any definite relation between measured leakage and heat input versus wind characteristics. It could be concluded only that the leakage of the individual huts changed with time and resulted in a thermal loss dependent on wind direction, velocity, and temperature difference.

The gradual development of laboratory facilities for steady-state thermal studies on built-up wall sections, both in Saskatoon and Ottawa, brought the test hut approach into new perspective. At best, it appeared that the hut technique offered only relative evaluation of wall thermal properties, and this only after a considerable time. A proper average value was obtained only after one year's operation; verification might require one to two years of operation. It thus became clear to those concerned that the huts were of value in two particular fields:

(1) Studies of the performance of components under weather conditions that could not be easily reproduced or defined in the laboratory; and

(2) Performance studies involving periodic effects, dependent as to source and cycle on natural weather conditions and seasonal frequency.

These principles guided subsequent work at the two test locations. Studies at Saskatoon concentrated on the thermal effects produced by natural ventilation of the wall cavity. The investigations in Ottawa, concerned with cyclical effects, were concentrated on the summer-winter moisture migration reversal in insulated masonry construction.

Discussion

Test buildings for use in building research may range from existing structures, built for the usual purposes without thought for research, to small simple enclosures designed for the exposure to the weather, of building materials or components. Between these two extremes there may be individual houses of unique design, groups of buildings having certain similarities, intentional or unintentional, full-scale houses differing in some singular predetermined respect, or unoccupied huts designed to obtain information on one particular aspect of performance. The main difference in each case lies in the number of variables that must be taken into consideration in evaluating the results obtained.

The vast number of existing houses that have been built in recent years provide a statistical "population" which can be "sampled" to obtain information describing the conditions of exposure of building materials and components. Records of temperature and humidity conditions indoors, fuel consumption, and foundation measurements can usually be accumulated with simple instrumentation and with the co-operation of the homeowner. In some cases, more detailed observations can be made. This information, obtained on an organized basis, can be used to define the conditions or to determine procedures for studies with small test buildings so that they may simulate the actual cases. Significant results can then be obtained with only a limited number of samples.

The utilization of these two types of "test" buildings, complementing each other, relegates the use of full-scale experimental houses to a few special cases only. It is indeed fortunate that this possibility exists, for the limited-number, full-scale experimental-house approach exhibits the disadvantages of both extremes. Almost as many of the primary variables as are involved in actual houses must be accounted for with only a token number of samples. The instrumentation and analytical techniques must be far more complex than with small-scale huts. Much more careful and extensive experimental design procedures must be followed, with little chance of subsequent changes being made except at considerable cost.

The concept of using actual buildings in conjunction with small test buildings and laboratory studies is not new, since the three progressive steps — from laboratory to pilot scale to full scale — have long been recognized as desirable in the development of industrial processes. The application to buildings is not, however, always so straightforward as in industry because of the number and complexity of the variables that enter into the full-scale building situation, thus complicating greatly the full-scale experiment.

Information relating to actual exposure conditions and to the performance of materials may be discovered either by design or by accident, in both actual buildings and in test structures. In the latter case, certain unexpected factors come to light more frequently because of concentrated and repeated observation, but information obtained through reports of problems from the field are still of great value.

Contrary to popular view, an experimental building is not always particularly useful in building research. For some purposes a building may represent but a single case from which little can be learned. In certain other cases a complete building may be the most suitable means for establishing realistically the conditions desired for study, but will seldom provide by itself an entirely satisfactory basis for experiment. Most problems can at some stage be handled best in the laboratory. There is a continuing challenge in building research to learn how best to combine laboratory and full-scale experiments in the solution of particular kinds of building problems.

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Is Vancouver's "ARCHITECTURAL CENTRE" a prototype?

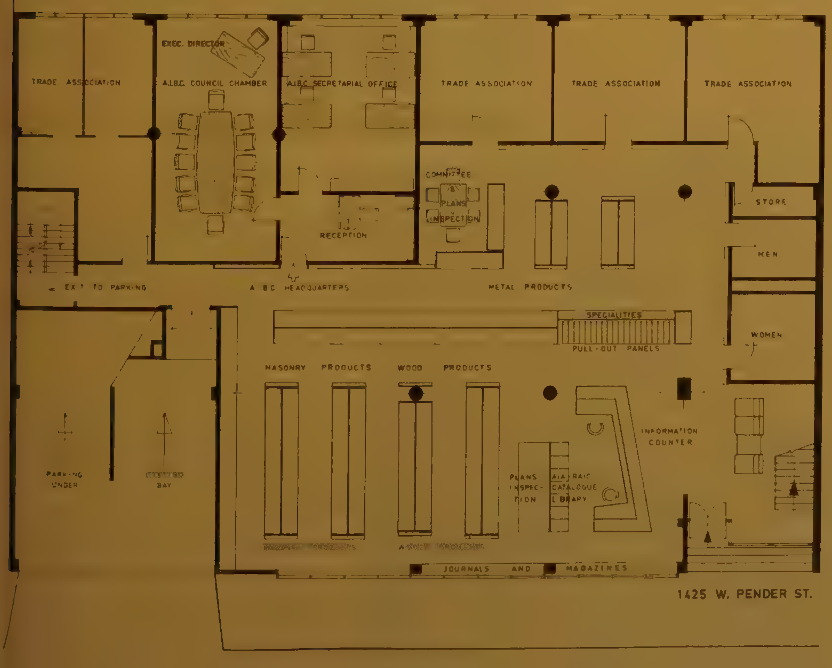
The RAIC-CCA Joint Committee on Building Materials expressed considerable interest in Vancouver's "Architectural Centre" at a meeting held during the RAIC Assembly in Quebec City in May, and the following article by Warnett Kennedy, MRAIC, ARIBA, AMTPI, Director of the Centre, is the result.



Although the Centre is primarily directed to all who are concerned with specifying materials and products, the general public are free to browse around. Regular press advertisements reiterate this invitation. Architects often send clients, and prospective home-owners are constant visitors. Photograph shows the Information Desk, and the Catalogue files beyond. Design periodicals are set out along the window ledges.

The offices of architects and building construction companies are the targets of a growing flood of technical and sales information. Brochures, leaflets, Journals, and samples arrive daily. Costly office space must be found to accommodate this material. Since few firms can afford to provide trained staff to index and file whatever items are of real use, it is a fair assumption that most of it is discarded after the most perfunctory glance.

It might be worthwhile to enquire as to its quality and usefulness. It comes in all shapes and sizes. Sales claims are inextricably mixed with dependable information. The several and dissimilar items made by firms are often found in the same brochure, thus requiring careful cross-referencing within each filing system. The number of items which an architect in Canada may have to have on file, if he hoped to have a theoretically perfect Catalogue Library, has been assessed at 50,000. A conscientious appraisal of all this information would use up the entire working life-time of an architect, and still leave an overspill. Once started the flood cannot be stopped. Advertising agencies distributing free material insist on claiming that X number of firms receive their brochures. All of this material keeps changing as products are withdrawn, new variations introduced, names of agents and suppliers altered, and addresses switched.



Nevertheless, each architect or specification writer hesitates to stem the flow because he feels that, buried within this confusion, lies information which is essential to him. How can he extract the 'pay-dirt' from the heap? How can he rid himself of the feeling of unease, that when he has firmly specified a

Here is one answer to the probl



WILLIAMS BROS

The "Architectural Centre" is located on the fringe of downtown Vancouver, at 1425 West Pender Street. To the north, it faces on to the harbour waterfront. Generous visitors' parking is provided underneath the Centre.

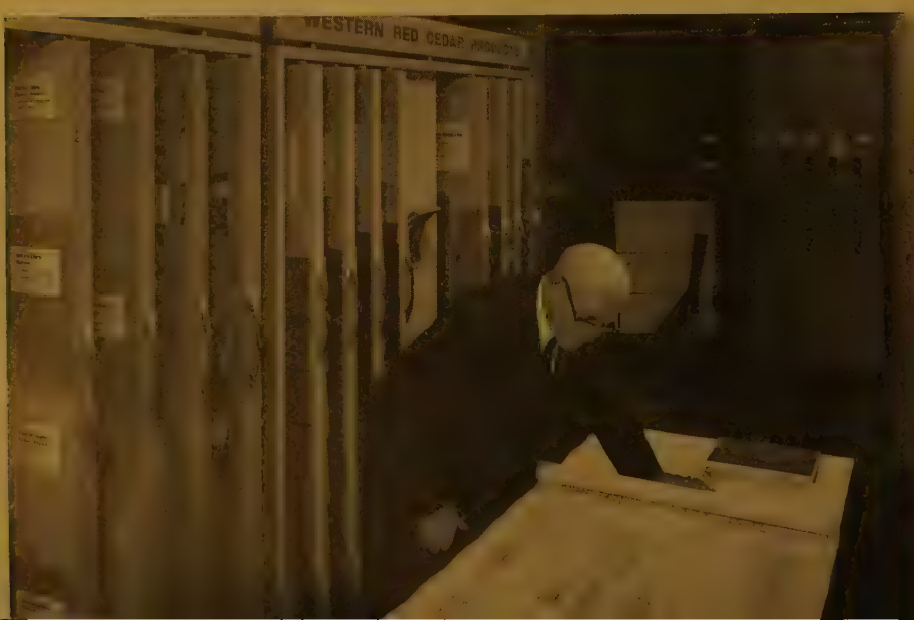
The Alcan display space showing a "case history" of a recently completed building, e.g. Dorval Airport. New buildings are shown every few months. Other wall panels show ranges of samples of flooring materials. Competitive products are placed side by side.

particular material he may unwittingly have failed to appraise many comparable materials unknown to him? One can forecast that the construction industries will have to create clearing houses for technical information if the future is to be faced with any confidence. Surely a first step would be the setting up, in each Canadian city, of well-organized, comprehensive Catalogue Libraries. Such libraries would have to be completely objective, institutional in character, rather than private enterprises. The Vancouver "*Architectural Centre*", in this connection, is considered to be the prototype, other than that operated by the NRC Building Research Centre in Ottawa. It is subsidized by funds derived from the rental of exhibition space and membership dues, and administered by a Board of Governors, having a majority of architects.

Considered as an experiment, the Vancouver Centre has cast light on many problems of detail. (1) It has proved to be



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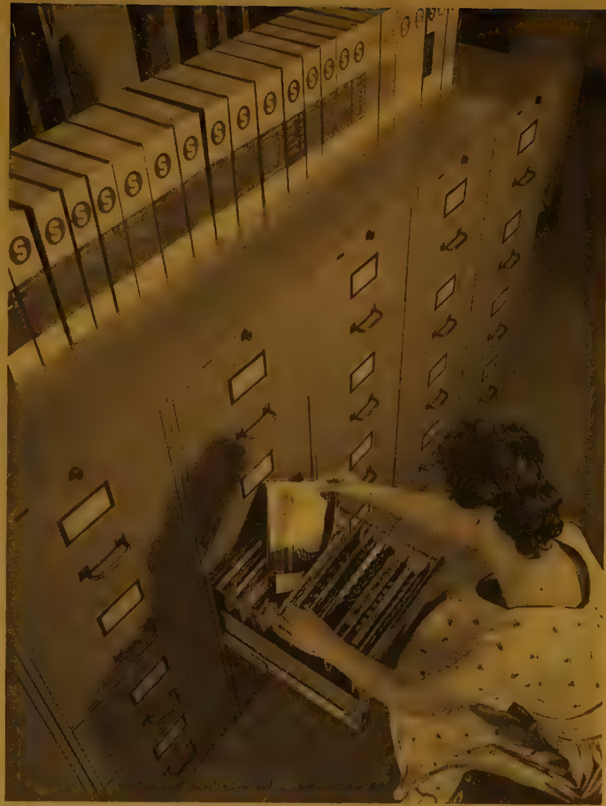
A Plan Inspection Service is operated in conjunction with the Journal of Commerce (daily and weekly). It is known as the AC-JC Plan Service. 82% of Vancouver architects have promised to loan plans for display during the bidding periods and 68% of out-of-town architects will send plans when warranted. Photo shows extra location for plans inspection adjacent to the samples file of McMillan, Bloedel and Powell River Limited.

insufficent to confine efforts only to the filing of the usual flood of literature. To balance up the contents of the library, the Centre takes the initiative by writing to manufacturers for specific items. (2) Positive day-to-day steps are also taken to keep the literature up-to-date and ensure correct names and addresses of agents. (3) Standardization of size of product literature to conform to AIA/RAIC is imperative. Already the overspill of bulky brochures is formidable. During the past few years the use of Plans Inspection Services has been growing steadily. They serve many practical purposes, saving time and space in architects' offices and tend toward wider and tighter bidding. One must be sure however that they are promoted for the declared purposes.

It seems to the Governors of the Vancouver "Centre" that the tie-in of plans-inspection with on-the-spot access to a Catalogue Library was a "natural", as is the loaning of plans and specifications by architects for display in their own Centre. Member firms, especially subtrades and suppliers, are able to inspect plans as often as they wish all year round, for a modest annual fee of $25.00.

The Construction Industry in Canada is perhaps too compartmentalized. The CCA is a world to itself. The RAIC has often been accused of "isolationism". Subtrades and material suppliers are almost separate breeds. Odd newcomers – organizations representing specification writers or quantity surveyors – are now demanding attention. Contacts between these organizations cannot be forever left casually to annual meetings, where the Presidents sit at top tables as guests.

Perhaps the organization of a chain of Canadian architectural or building centres, if sponsored by the Canadian Joint Committee on Construction Materials, will call for new forms of day-to-day working collaboration between all segments of the complex building industries.



WILLIAMS BROS

The Catalogue Library operates the AIA/RAIC Standard Filing System supplemented by "Sweets" and other directories. Already 4,500 brochures are filed under 256 headings. A constant stream of telephoned and desk enquiries is answered by a full-time librarian. A register of trade names is maintained, and has already grown to 878 names. The Centre does not give advice – only information.

Architectural or Building Centres are a phenomenon of our age of building. In widely differing form, they are found throughout the world. Here are the Main ones–

Washington, New York, Miami, London, Manchester, Bristol, Glasgow, Dublin, Paris, Rotterdam, Hamburg, Lille, Cologne, Vienna, Brussels, Antwerp, San Sebastian, Stockholm, Copenhagen, Helsinki, and Vancouver.

THE BOUWCENTRUM IN ROTTERDAM, HOLLAND, *founded in 1948, comprises four Foundations – the Foundation Ratiobouw (scientific research allied to practical problems of building), the Building Documentation Bureau, the Journal "Bouw" and the Bouwcentrum itself.*

The blanket definition is "an international information centre for building and housing". Visitors during 1958 numbered over 80,000. By 1959 over a thousand exhibitors were catalogued, and 2,500 members. More than 9,000 telephone enquiries were handled in 1948. Traffic was analysed as follows: government – 10%; architectural and building engineering–25%; industry–25%; education, social work, nursing homes–40%.







THE ARCHITECTS INTERNATIONAL BUREAU OF BUILDING PRODUCTS, MIAMI, FLORIDA, *forms part of the giant Dupont Plaza Center, an hotel-office-display complex, in Miami, Florida. It covers an impressive 200,000 sq. feet of floor and wall space. Exhibits are eye-catching and well presented, but one does not get the impression that it served the day-to-day needs of architects. For example, only the catalogues of companies paying a fee to the proprietors are included in the library.*

The Architects' Samples Corporation of New York is a private enterprise and reputed to be nearly 50 years of age. It is located in the "Architects' Building" at 101 Park Avenue. Approximately 50 firms of architects are located in this building. The samples are on the Ground and First Floors, thus enjoying "built-in" traffic of architects and their assistants. The writer observed that about six male telephonists were busily engaged in replying to telephoned enquiries.

The Building Centre, London, England is a non-profit organization controlled by a council of architects, surveyors, engineers, builders, and other eminent persons. President is Sir Basil Spence. At the end of 1959, it had 627 exhibitors. Enquiries totalled 147,510. The total number of items on which information is sought has been estimated at more than 200,000 per annum. Enquiry staff numbers 18. No advice is given.

A breakdown of telephoned enquiries was as follows — Architects — 35%; Builders and Builders' Merchants — 25%; Surveyors — 15%; Government Departments — 5%; and public and press — 20%.



DEL ANKERS

NATIONAL HOUSING CENTER, WASHINGTON, DC. *Several floors of well-organized displays are included in the National Housing Center, a subsidiary of the National Association of Home Builders. As the name implies, materials and products are restricted to the field of home building.*

Sport and the Community

A Study of the Facilities Required

by C. Ross Anderson



ORIGIN AND DEVELOPMENT

SPORT AND THE COMMUNITY owes its origin and fruition to many sources and to the efforts of many persons. Basically it is a "Friday afternoon project" of the type recommended by Alan Jarvis at an annual convention of the Ontario Association of Architects. That is, there were no clients and no salaries involved and the problem, since it had never been stated before, had to be uncovered before it could be solved.

The authors of the project, although mostly architects, represent a variety of other disciplines including Planning, Engineering, Journalism and Art. The advantages of such diversity in a project team are found principally in the multitude and variety of ideas available; the difficulties stem from the same source and are found in the gathering of these ideas on common ground for analysis and presentation.

The completed project, including delays and lay-offs when people were thinking but not writing or drawing, has taken more than five years of "Friday afternoons" and includes two large models and a total of nearly one hundred designs, drawings and architectural plans. The purpose of this article is to illustrate the potential interest of architectural and planning studies of this sort when tackled objectively and free of the restrictive need for profit, and to show the practical significance of a general study founded on carefully developed principles and applied to a specific situation – in this case the city of Metropolitan Toronto.

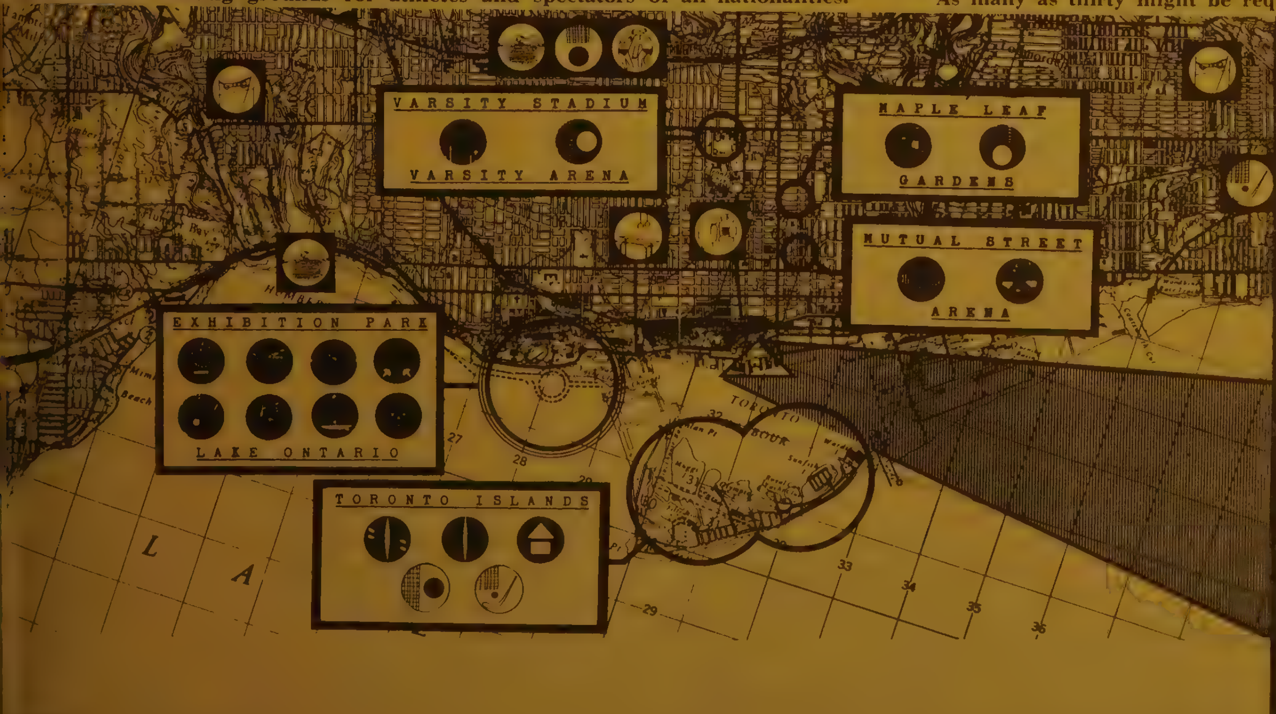
The specific study of community sports facilities developed from an inclination among the members of the original discussion group to deal with the problems of the community at large, and from the evidence of a certain urgency in the needs of organized athletics as demonstrated by the low standards of physical fitness among Canadian youth. This urgency was expressed succinctly by Prince Philip in speaking to the Canadian Medical Association 1959: "It is estimated that 34% of the male population of military age are unfit for military service, in which case the prospects are not very good if an emergency should occur. Then there is the less vital question of national prestige in sports and games. With a few notable exceptions Canada's achievements in this line are hardly in keeping with a country which claims almost the highest standard of living in the world."

In the beginning there was no thought of applying an organized plan for international games to the city, or for that matter of developing a specific plan at all. We followed discussion wherever it led and the principal considerations from which we began were the recreational needs of the individual citizen and the group of which he forms a part – of any group in any city. However it was soon realized that his approach led inevitably to consideration of the interrelationship of groups and thus to a complex which, like many urban phenomena, had a focus or a core.

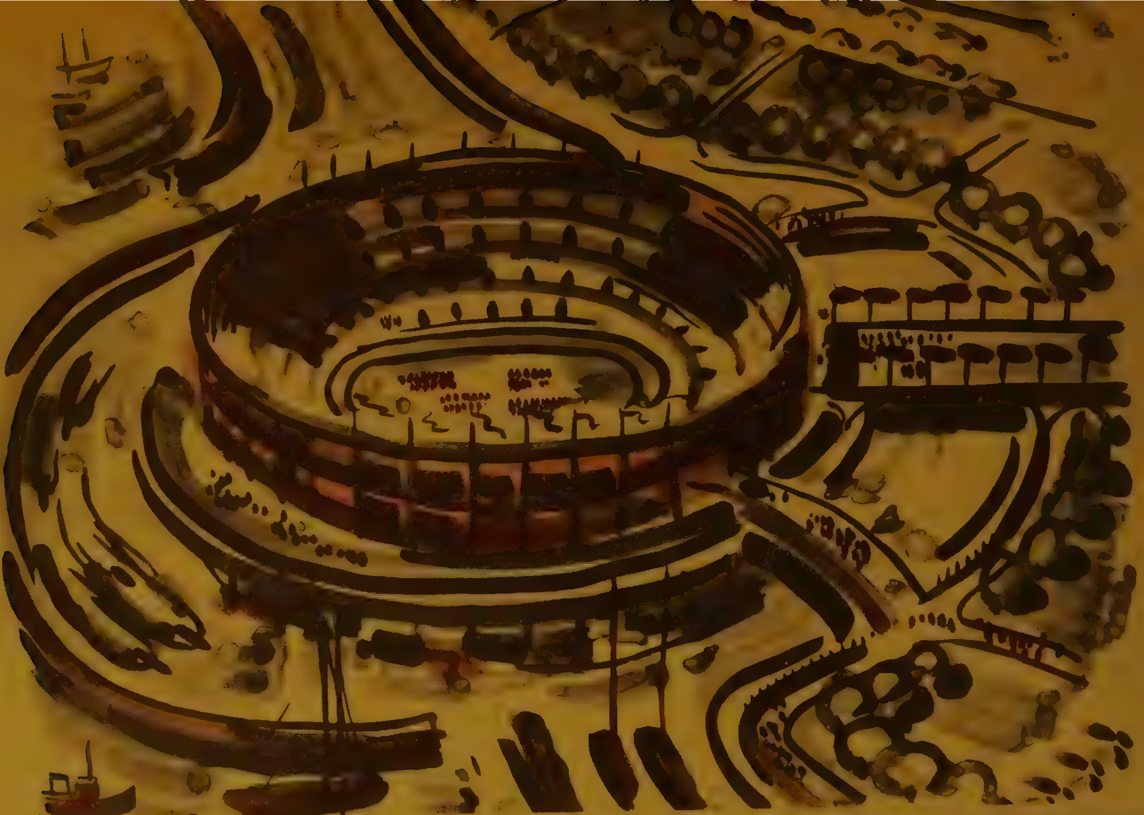
THE GAMES CENTER

To serve with maximum efficiency it was found that this core would have to meet certain standards, and once these standards were established it became possible to work in two directions at once. That is, the needs for active recreation in the entire city could be studied at the same time as those of the local community. The pattern which emerged was one of increasing concentration of facilities from the periphery, where each group of neighborhoods would have sports terrains

Symbols are the language of international sport. These designs would be used during the Olympics to indicate competitive venues and training grounds for athletes and spectators of all nationalities. As many as thirty might be required.





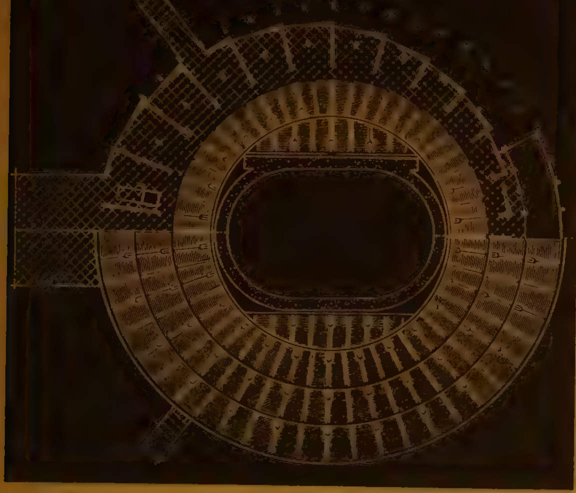


The principal focus of international games is the main stadium. This stadium should accommodate up to 100,000 persons. However since the optimum stadium size in Toronto is probably more like 60,000 it is possible that a certain amount of seating could be of a temporary nature. The permanent value of such a stadium to the community is of great importance and it should be capable of accommodating baseball as well as other field sports in order to achieve maximum utilization. The site, on filled land off Toronto's Exhibition Park, completes the Games Center. A "moat" around the structure provides an exciting turn for small boat races.

THE OLYMPIC GAMES: SUGGESTED SCHEDULE OF EVENTS

Symbol	Event	Location	Time THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	Remarks	Estimated Initial Cost $
	OPENING	OLYMPIC STADIUM	A																		
	ATHLETICS	OLYMPIC STADIUM		M/A	M/A		M/A	M/A	M/A	M/A	M/A									Olympic Stadium proposed. School grounds and existing fields available for practice.	15,000,000
	BOXING	MAPLE LEAF GARDENS	N	A/N	A/N		A/N	A/N	A/N											No additional buildings required. Schools, University, YMCA, YMHA available for practice.	
	BASKETBALL	MAPLE LEAF GARDENS								M A/N	M A/N	M A/N		M A/N	M A/N	M A/N	A/N	N		No additional buildings required. Schools. University, YMCA, YMHA available for practice.	
	CYCLING	EXHIBITION STADIUM / ROAD COURSE										A/N		A/N	M					Requires a banked track, length up to 400 m. 120 mile road course to be selected.	100,000
	FIELD HOCKEY	EXHIBITION STADIUM / OLYMPIC STADIUM		M/A	M/A		M/A	M/A	M/A	M/A	M/A			A		A				No additional buildings required. Schools and existing fields available for practice.	
	FENCING	AUTOMOTIVE BUILDING, CNE		M A/N	M A/N		M A/N	M A/N	M A/N	M A/N	M A/N	M A/N		M A/N	M A/N	M A/N				No additional buildings required. Practice facilities available if required.	
	SOCCER	VARSITY STADIUM / OLYMPIC STADIUM		M/A	M/A		M/A	M/A	M/A	A	A	A			A		A	A		No addtional buildings required. Schools and existing fields available for practice.	
	WEIGHT LIFTING	MUTUAL ARENA or CNE COLISEUM		A/N	A/N		A/N													No additional buildings required. Schools, University, YMCA, YMHA available for practice.	
	WRESTLING	MUTUAL ARENA or CNE COLISEUM						M/N	M/N	M/N	M/N	M/N		M/N	N	N				No additional buildings required. Schools, University, YMCA, YMHA available for practice.	
	GYMNASTICS	VARSITY ARENA										M/A		M/A	M/A	M/A	M/N	M/N		No additional buildings required. Schools, University, YMCA, YMHA available for practice.	
	SWIMMING & WATER POLO	OLYMPIC POOL						A/N	A/N	A/N	A/N	A/N		A/N	A/N	A/N	A/N	A/N		Venue proposed. Four to six 50 m. practice pools required. Two presently available.	
	EQUESTRIAN EVENTS	NEW WOODBINE / OLYMPIC STADIUM										M/A		M/A	M/A	M/A	M/A	M/A	A	No additional buildings required. Selected course of roads and trails must be available.	1,500,000
	YACHTING	LAKE ONTARIO		A			A	A	A	A	A	A								Mooring and racing facilities available. Launching facilities proposed.	100,000
	ROWING	LONG POND, TORONTO ISLAND			M/A		M/A	M/A	A											Existing course must be extended to 2000 m. clear length, 100 m. clear width.	200,000
	CANOEING	LONG POND, TORONTO ISLAND								M/A	M/A	A								Regatta course similar to above. Ten-mile marathon course proposed.	50,000
	MODERN PENTATHLON			M	M		M	M	M											All events may be accommodated on existing or proposed terraine.	
	SHOOTING	OLYMPIC RANGE								M	M	M		M	M					Permanent range required. Coordination with national defence requirements anticipated.	250,000
	DEMONSTRATIONS	OLYMPIC STADIUM				A							A					M		May include dancing, music, and sports such as Lacrosse or speedboat racing.	
	CLOSING	OLYMPIC STADIUM																	A		
	OPTIMUM SEASON FOR INTERNATIONAL GAMES: JUNE 15 TO JULY 31.		OLYMPIC STADIUM							M: MORNING			A: AFTERNOON			N: NIGHT				TOTAL	17,200,000





OLYMPIC STADIUM, WATERFRONT PARK

suited to its specific needs, to a chosen "Games Center" where all important sporting events in the city could take place. If all these facilities were coordinated to Olympic standards it would then be possible in a city of sufficient size to provide both spectator accommodation and practice grounds capable of supporting international games without overtaxing the city's normal resources.

This is quickly seen to be the case in Toronto and two advantages can be inferred which seem to justify a serious effort to achieve such coordination. First, the community as a whole would gradually become capable of producing superior athletes, which in turn would induce a general stepping up of physical competence; and second, if our sights are raised high enough, it would be possible for Toronto to act as host to the Olympic Games if the occasion arose

TORONTO'S PROBLEM

In studying the facilities required to achieve international standards in sports facilities it was necessary to assume first that it *should* be possible to accommodate the Olympic Games in Toronto, and then to compare the results with Toronto's purely local needs. The similarity of the two requirements seemed sufficiently close to justify an attempt to make them correspond exactly.

It was found for example that one of the principal problems limiting international competition is the lack of practice terrains. Some sports require eight or ten supporting sites which are all in use at the same time as the main competitive field. This brings us back immediately to the concept of neighborhood pools, gymnasia and other installations serving local needs with small spectator accommodation, but coordinated to Olympic Standards and available for practice during the Olympics.

On the other hand, although many supporting facilities would have to be built, only twelve major terrains or "venues" would be required for actual competition during the Olympics, and of these twelve, eight already exist and could serve with minor adaptations, while the other four are structures which are being discussed or are badly needed in the metropolitan area at the present time. Moreover, all but one of the existing installations, and a location for all except one of the proposed structures, can be found within a radius of less than three miles from the Toronto City Hall. Surprising as it may seem few cities in the world could be found with a "Games Center" as mature and well grouped as Metropolitan Toronto.



THE regatta course on Toronto Island could be the finest water-way in the world, but a considerable extension of length is required. Present municipal plans include this regatta course out and unless a more enlightened approach can be achieved by the city's administration an Olympic course for rowing and paddling in Toronto will become either impossible or exhorbitantly expensive.



SHOOTING, essential as it may be to national defence, may soon be a submerged skill unless facilities for civilian competition are procured. Since a safety zone of considerable area is required it is proposed that this Olympic venue be built outside Toronto and combined with the Canadian Army installations at Camp Borden about forty miles to the north.



A Municipal Swimming Pool is already under discussion in Toronto. The site shown here is on the lake-front to the west of the Olympic Stadium and has already been revised slightly as shown in the model to include both an indoor and an outdoor pool with spectator accommodation and a Municipal Beach for swimmers who prefer Lake Ontario.

HOUSING THE ATHLETES

This summarizes the problems specifically concerned with sport per se, but another problem involved with international games remains: that of housing the athletes. The total athletic community involved in the Olympics may exceed four thousand persons. Since in any city where international games are held all normal accommodation is required for visitors, it has usually been necessary to build new housing for the athletes. This housing is used first at the time of the games by them and subsequently as permanent shelter for the community itself.

In most cities this housing has been in outlying areas which involve a considerable problem of transportation. In Toronto a remarkable opportunity for a central games village exists in the redevelopment of the community on the Toronto Island.



CONCLUSIONS

In conclusion, it seems likely that Toronto could become an Olympic City with very little effort or expenditure beyond that which it faces in the immediate future under any circumstances. A considerable effort would be necessary to coordinate what at present appears to be a group of unrelated buildings and terrains and a great deal of administrative inertia would have to be overcome. Still, the possibility remains, and the means of accomplishing it have been stated and made available.

In this the purpose of our study has been achieved and an original contribution has been made to Canada's chances in international competition. Sport and the Community has been presented as a project to the administrative authorities of the Metropolitan Toronto area with a recommendation for action which would make the project a reality. Unfortunately official comment has been limited to, "As we did not ask for it, it won't work; we could never afford it anyway; and, we have built a restaurant where you have shown a regatta course".

Still, I regard the project Sport and the Community as a remarkable personal achievement and I believe that I speak for other members of the group in expressing our confidence that our reasoning and conclusions are correct. In any city a similar process could be applied to this or any other problem, with equally remarkable results.

Members of the project collaborative:

Ross Anderson

Peter Goering — *Raymond Moriyama*
Ronald Haggart — *Marek Pain*
Tom Hodgson — *Gerald Robinson*

In planning the redevelopment of Toronto Island the first element placed was the Olympic regatta course. The major proportion of land (about two-thirds) is reserved for park and a portion of the newly developed community, planned for a capacity of from 8,000 to 10,000 persons could serve as temporary accommodation for some 4,000 athletes at the time of the Olympic Games.



Architects and the Structure

by

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An address to the annual meeting of the Ontario Association of Architects

THE interplay between architecture and physical phenomena must obviously be very intimate at any time, but it assumes critical proportions when man's mastery, knowledge of, and preoccupation with these phenomena is as advanced as in our times dominated by science and technology. It brings both blessings and dangers; its pattern is cyclical, ranging from overenthusiasm with techniques to their misunderstanding and neglect; its imprints are evident in such landmarks of modern architecture as the Crystal Palace, the skyscraper and the concept of a building as a "machine for living".



Architecture, as far as its basic object and values are concerned, is the same today as it was in times of Pericles, Vitruvius or Boromini. It provides an abode for various activities of man; geometry used as art, biological and social conditions used as function determinants form its basis; while materials and physics are its tools. The diversity of geometric forms at its disposal is perhaps not limitless but certainly very large, and the limits of this diversity are directly dependent on the type and amount of understanding of these tools. It is here that modern technology comes in, by providing matter in convenient, economical and varied forms. Besides reflecting the social and mental climate of the time, which always was the case, architecture has at her disposal today a greatly increased supply of tools, in contrast with the past when, for centuries, these tools were few and changed but little. Modern technology, growing for 100 - 150 years, made a significant advance in the last 30 years or so. The use of this advance for building in terms of performance and economy has begun, but its potential is by no means exhausted. Its translation into architectural expression is probably even less complete.

In the past buildings were the major physical achievements, the major monuments produced by man, so that obviously most of his technological efforts were directed towards this goal, while at present most of the tools potentially useful for the architect are being developed for various other applications. Their rate of change is rapid, again in contrast with the past, and their character most impressive for the uninitiated.

In effect, it is easy for the architect to lose touch with the tools, to miss their potential, or even their existence; to be overpowered by their apparent complexity, to be greatly surprised by the entirely new solutions made possible for this age old problem. One way out is to hire somebody with special skills and knowledge to control and manage the tools. This, however, carries a potential danger that the hired man can become the master, especially if the tools are intimately related to the work. Thus a closer look at the tools is necessary. What is their nature, what do they offer, how does one use them to full advantage? Such questions are likely to be behind the current interest in technology on the part of philosophers and practitioners of architecture. I shall analyze a few of these problems from a technologist's point of view, on the basis of familiarity with tools and a general interest in architecture, stressing the physical aspects of buildings and avoiding trespassing into the purely architectural implications.

Physical aspects of buildings are many, but they can be segregated and graded according to their relative importance for the "architecture" of buildings, which, in a final analysis, means form and geometry. Control of the interior with regard to temperature, light, sound, sanitation, was always an essential attribute, even the objective of design, but at present, because of the progress of science, and our civilization's emphasis on physical comfort, the requirements in this sphere became very stringent. Heating, plumbing, the mechanical and electrical systems form an integral part of modern buildings, frequently also a large share of their cost. However,

they are composed of specialized equipment for the conversion and distribution of various forms of energy, they contain complex and precise mechanical devices, and thus they require a high degree of technical knowledge for design and manufacture. This, together with economy, makes it imperative to standardize such equipment and produce it in factories. It becomes a sort of "furnishing," for which the architect must intelligently allocate the space, the selection and installation of which calls for a consultant, but its effects on the form of building are in most instances minor.

Light has definite possibilities for architectural effects, but again its manipulation to this end is relatively independent of the shape of the buildings.

The control of sound has a more intimate connection with the architecture of buildings, their forms, proportions, division and materials. Therefore, the understanding and application of its principles are a concern of the architect. Such principles are not complex, if clearly stated, on the whole they can be expressed without resort to involved mathematics, and their application to problems of buildings is more a matter of judicious use of basic physical principles and experimental data, than of any involved analysis. Only a small percentage of buildings offers scope and need for a special acoustical treatment demanding a consultant, but most would benefit by the designers' rational approach in coordination of sound phenomena with function and architecture of buildings.

Having thus concluded, or at least contended, that the "technological furnishings" of buildings have little effect on their architecture and are a domain for the specialist, we should look at the physical aspects of the fabric proper of buildings. By fabric I mean the enclosure of the buildings, the assembly of materials separating inside from outside, and the subdivision of interior space. This implies volume and form of the building, *ie* its architecture. Materials composing this assembly have limited strength, the assembly is standing within the gravitational field, *ie* subject to loads, and thus forms a structure. In such interpretation structure and building are identical as an object, except that the term "building" is all inclusive, while "structure" refers to its physical features, stability and strength primarily, plus thermal characteristics, durability, density etc. of the materials of enclosure. Their spacial arrangement is decided primarily by structural considerations, *ie* stability, strength, rigidity, efficiency in transfer and balancing of forces, all of course within the overriding demands of the function of the building and the accepted criteria of appearance.

MODERN materials allow for a fair amount of articulation within such a concept of structure, *eg* the steel frame is used exclusively for the transfer of forces, the infill walls for temperature control and wear. However, even then logic and physical soundness favour some forms, proportions and relative arrangement of different elements.

The idea of creating the structure independently from architectural design and inserting it into the building, as one does with a heating boiler or an electric transformer, appears false and unjustified, although it is preached in some circles and although it might work reasonably well in some special cases or be forced to work in some other situations.

The basic elements

IN the past, the structure of the building was distinctly the domain of the architect and even in larger buildings one of his major challenges, with separation almost inconceivable. He was responsible not only for the spirit and charm of his buildings, but also for their physique. This latter responsibility today tends to be either voluntarily renounced or taken by default by somebody else, and this happens at the time when the opportunities for architectural expression are particularly bright, when many organic limits have been removed and a large variety of forms is possible. Maybe it happens because of the confusion brought by too many possibilities, because things became too complex to be handled by one individual A closer look at these new possibilities could clarify the issue.

Let us start with basic elements of structure — its materials. The traditional ones which lasted for centuries, masonry of different varieties and timber in the form of more or less coarsely shaped pieces of tree trunks, have been replaced by much more diversified group of technologically processed materials. Steel and other metals, with their high strength-volume ratio and resulting suitability for the "par excellence" structural element; timber in a sophisticated form of laminated members maintaining the high strength weight ratio and characteristics of material produced by nature for its own structures, but free from size and shape limits of solid lumber; and finally, reinforced and prestressed concrete, with durability and fire resistance of mineral matter, but overcoming the lack of tensile strength, and size and form restraints of traditional masonry, by judicious interlocking with sinews of steel and by its shaping in the plastic state. Processing of present materials, together with an efficient organization of testing and distribution, narrows down the variations of their properties. Knowing precisely what to expect from material, one can use it efficiently and refine the structure with regard to both economy and appearance. In buildings however, an extreme reduction of dimensions and amount of material is seldom important and overriding as in, let us say, bridges or airplanes —especially if structure is integrated with other functions.

The use of the full potential of materials in buildings involves both functional space demands and structural performance, the resulting shapes become fairly complex and then methods and procedures of construction assume a deciding and important role.

Techniques for shaping and joining parts of buildings or different materials, and of performing work on the site belong to this category. Much has been changed here from the times of the master builders, and such change is likely to be reflected in the spirit and scope of design. Previously, almost all operations connected with construction were performed on the site, while now more and more of them are transferred to the factory, where fixed manufacturing equipment, independent from weather, make possible more complex forms, refinement in finishes and dimensions, close tolerances, high efficiency

and speed of construction. Mass production methods, although slowly and reluctantly, are penetrating into the building industry, and the spirit of efficiency, organization of work, and repetition associated with it, are likely to leave a mark even on custom designed buildings. When left unchecked, these modern trends could overpower the building with resulting monotony and the lack of individuality peculiar to mechanization. The understanding of the objectives and methods of mass production on the part of the architect, could guard against this danger while allowing him to exploit intelligently their benefits, mainly for the sake of economy. The impact of techniques on design is varied, depending on their character; some dealing with joining and forming, welding of steel, handling and forming of concrete, etc., are applicable directly; while others, like the performance of cranes and other construction equipment, have only an indirect effect.

Materials and techniques

The actual operation, management and execution of these techniques belong obviously to specialists, tradesmen, contractors, engineers, who have to master their details, be it at the level of a welder, construction foreman or structural steel designer. The architect does not need the actual skills, but should have an interest and some degree of familiarity with their scope and range of possibilities. Such familiarity is of necessity based on a number of down to earth facts, but it should bring in reward likely departures beyond minor variations of routines and a feeling of more freedom and independence in many decisions of design. The techniques are also very important for so called "architectural detailing" involving joining of a variety of materials of different physical characteristics. The traditional standard details and methods of teaching them in schools are frequently as outmoded as stone arches, and an individual approach based on rational use of physics and a knowledge of techniques becomes imperative.

More and better materials, and improved techniques for their shaping, joining and handling resulted in a tremendous increase in the number and scale of geometric forms for architectural application, *ie* forms meeting the functional, structural and aesthetic requirements. The history of man's building, both in time and location, demonstrates that a great visual variety was possible even with limited means of stone and timber, ranging from heavy spherical shells of Romanesque domes to gravity frames of the Gothic; intricate timber space frames of the Northern Europe to bearing walls and iron tied arches of the Renaissance palaces. When only a few of what one might call structural systems were possible, the refinement of details, variations of proportions and applied decoration broadened the range of geometry and architectural expression within the few random examples mentioned. The contemporary "repertoire" of structural systems is much more extensive. From the old ones, which are today at a disadvantage because large amounts of skill and manual labour are essential for them, to box structures made up of shear walls and floor plates, each element capable of bearing any type of load and all joined into a monolithic unit; thin membrane shells of curved surfaces; two and three dimensional lattice-works of tension and compression members; arches without the rigid limitations of form imposed by masonry, such arches in case of complete freedom of form becoming rigid frames. Then there are the "cobweb" like suspension systems, not yet fully exploited, potentially unstable, but offering a challenge to an imaginative designer and a reward of flowing, limpid surfaces at a very reasonable cost. And, of course, the old cross-work of superimposed planks, joists, beams, girders, still most suitable for many simpler situations, but unfortunately lingering on in situations where it is out of place and demonstrates mental inertia, as for example, in monolithic concrete, both with regard to form and theory of performance.

Such a variety of systems could hardly have been developed and proven in a comparatively short time by empirical evolution alone, as was the case with the classical forms of the past. Here the scientific method came to the designer's aid. Experiments and speculation resulted in the formulation of laws of behaviour, criteria of safety were established, and methods were devised for the detailed analysis of effects of forces on different types of structures. The performance can be predicted in advance with at least reasonable certitude for most simpler situations.

So armed with a variety of materials and techniques and bolstered in his confidence by scientific speculation, the modern architect can produce a terrific variety of shapes, much more so than his predecessors. Such a blessing is however, associated with a number of problems and difficulties.

The choice of one of many alternatives in materials, systems, forms, or their refinement or the creation of new forms, can be an "intelligent" action, based on assessment of performance, advantages etc; or one can pick out at random from many highly praised solutions, each, with its likely pressure group of commercial or industrial interests claiming their own peculiar superiority, but with little concern for the building as a piece of architecture. The "intelligent action" is more difficult because, by its nature, it demands knowledge and rational thinking, *ie* a long and short term effort. The volume and appearance of knowledge associated with structures is at first glance forbidding. Arguments arise that it has to be left to a specialist in the same manner as in the field of mechanical and electrical services; that specialization is an accepted phenomenon of our times and in almost all spheres. However, because of the close relationship of form and structures, this would mean the delegating of the architect's main prerogative to the specialist, and maybe eventually reducing the architect to another one of many specialists, dealing only with some particular aspects of the building. Or the architect becomes merely a chairman of a committee of experts of design in various fields. There are many impressive works decided upon and built on the basis of a cross-section and compromise of opinions, but some doubts arise if this approach suits the domain of art, to which architecture claims on allegiance.

ALTHOUGH the body of knowledge, theories and scientific methods dealing with structures is voluminous, and much of its mathematical language forbidding

to the non-specialist, the essence, and principles of performance of structures are comparatively simple. They involve mainly the balance of forces in stationary objects made of solid materials and present few problems, compared with, let us say, the unsteady flow of compressible fluid of modern aeronautics or the intricacies of electrical phenomena. Most of the complexities of the theories are either of purely scientific interest, or deal with procedures of analysis or aim at an extreme refinement in details and economy, which is seldom, if ever, necessary in structures of buildings.

The architect is primarily interested in the overall concept and performance of structures, in their range of load capacities, of shapes and of dimensions; in the scope of techniques and materials. Based on these needs the volume of factual and speculative knowledge can be considerably reduced, without impairing its thoroughness or lapsing into superficialities, and allowing at the same time a full grasp of structural implications and possibilities, short of producing a specialist.

SOME practical difficulties exist in the acquisition of this type of grasp. There is a lack of texts with the right approach – most are geared to the needs of specialists; others in their attempt for popularity over-simplify things. The instruction in most of the architectural schools with regard to content, approach and methodology leaves much to be desired. Courses in various aspects of structures and other technical features of buildings, sometimes even of quite an advanced character, have frequently a misdirected nature with too much emphasis on analysis. Moreover, the effectiveness and value of such courses can be reduced or even entirely cancelled by the atmosphere and spirit of instruction in architectural design. This subject has most appeal to the student and rightly so, because it forms a synthesis of his final goal and mirrors his future real life activity. If in this course a philosophy of separation of architecture and physical aspects of buildings is accepted, the last ones being treated almost with condescension and assigned *a priori* to specialists, students soon take a superficial attitude to other fields, especially because it makes their work in design much easier. Even though life and practice later on give ample evidence that the physique of building can not be disregarded, the mental attitude acquired in school lingers on and leads to over-reliance on specialists.

There are also objections of a more general nature. Rational thinking and knowledge, both assumed as necessary attributes for successful handling of structural and physical problems of buildings, are considered by some people as antipathetic to the concept of architecture as art. Conflict is implied between emotion and reason; intuition is set against certainty by analysis, imagination against facts. One side of the scale is given to the artist, the other to the scientist or engineer. But are such conflicts valid, or are they not based on emotion and convenience?

Science, even although it is concerned with facts, could not go far without imagination. Only the most obvious facts are registered and perceived directly by the senses, and the more hidden ones can be arrived at only with the help of a great deal of imagination. Emotion and reason are both manifestations of the human spirit, and some combination of both appears essential in architecture. Intuition, provided it is right and correct, is actually identical with certainty. It lacks devious proof and lengthy arguments for its correctness, but instead it is drawn in a flash from one's acquired and maybe even inherited experiences and knowledge stored neatly somewhere in the electronic system of the brain.

More active interest, participation and involvment of architects in structural questions does not mean disposing with the specialist-consultant, who still has an important role to play. His intimate knowledge of performance, of details related to materials and techniques, of the intricacies of procedures and regulations, are all necessary to resolve many doubts within the general concept, to peg down the final dimensional answer, to search for economy, to supply proofs of conformity with many formal rules and standards peculiar to the building industry. The use of team work and the division of responsibilities, especially in the preparation of final working documents, is also dictated by the pressure of time always present in our day.

Even when the structural specialist guarantees that the building will not fall down, the responsibility for the architecture of it is not his, so there is little stimulus for him for the more creative approach to structure, or for its full integration with the building. To do this he would have to turn into an architect, for which he seldom has any ambition, or encouragement during his training. To exploit the structure as a building could be very challenging, but it must be left to the architect; while fitting the structure into the building is to a large extent a matter of routines and conventions, and a creative engineer finds more scope in bridges, dams, towers and more glamourous fields of space travel, electronics, etc, where he is the complete master. In effect the structural specialist takes care of many details of formal guarantees, and is an important member of the design team, but his presence does not, or should not, absolve the architect from his interest and understanding in this field.

Some implications of technology

The increased opportunities for architectural expression offered by science and technology, apart from procedural matters in exploiting them discussed before, also have consequences, of a more general or philosophical nature. It is from the point of view of an interested layman that I shall consider some non-technical implications of technology.

IN the past the limited means and the empirical approach allowed only a few forms and their rate of change was slow. One variety was likely to dominate the scene for several centuries. Now, buildings entirely different visually, can and frequently are going up side by side at the same time. The squat spherical domes beside the pointed, folded plate; modern gothic; the massive windowless concrete enclosure as a neighbour to slender lace-like steel and glass framework; the box form of UN building mated with the flowing curved buttress of the Toronto City Hall. A great variety of shapes has already been used, many more, offering some advantages, are possible

and likely to appear on the scene. It is true that specific needs associated with the purpose of building, *eg* office sky-scraper, exhibition hall, church or hospital, give preference to some structures and forms, but a wide choice is still left to the designer's mood, judgment and discrimination, apart from any economic or engineering aspects. There are two cases to be considered – an individual building and a collection of buildings. Looking at a single building, an extravagance of form, lack of obvious relationship of shape and function on one hand and absence of criteria of aesthetics and proportions on the other, could easily result, and could justifiably be objected to. The technological exuberance evident in many recent buildings may be an expression of surprise on the part of the architects at their newly discovered freedom, or at the unexplored fields of geometry unlocked for them by the new tools, or a case of doing things for the fun of it; for proving to themselves that they can be done despite the old rules and canons. But some restraints for such exuberance are needed. Maybe it will wear out by itself because even technology and geometry have their limits. Building in our time seldom stands in isolation and its own glory, but as a rule in large concentrations of towns and cities, and however rewarding for the ego of a designer the interest and originality of an individual building might be, some consistency and unity of character in the multiplicity of buildings seems necessary.

IF the impression of a single too extravagant building could be unpleasant, streets and districts of unrelated and different edifices standing side by side would probably be distressing. Boards and commissions so popular in our over-organized societies could be formed to overcome such dangers by rules and regulations, but a sense of social responsibility and discrimination on the part of architects should produce better results.

Structural expressions

This gives probably more justification to styles and fashions in our times of material abundance than in the past, styles understood as criteria of correctness, consistency and some similarity of exterior forms – not as efforts to create a larger number of original and different visual impacts. Because such efforts might sometimes become style in themselves and form one extreme of a scale, there is no need to reach to the other extreme and identify the style with rigid limitations of form. The sense of taste and quality can find a golden medium of considerable richness, while local traditions, social climate, or strong personalities can give a distinct flavor. It might be convenient to conclude that the acceptance of stylistic moderation and limitation means also the rejection of some of the technological tools, and absolves the architect from their previously advocated study and understanding. This obviously is at least unrealistic and contrary to human nature and its natural curiosity. The point is not to reject the means, but to use them properly. The full realization of the possibilities and character of technology – which is here to stay whether we like it or not – should allow us to use and control it for this purpose, instead of being forced to accept meekly all its varied offerings and while trying to make the best of them. Much of the over-exuberance and objectionable extravagance mentioned previously could very likely be contrary to sound structural principles, if particular cases were analyzed exactly. A notion of structure is well ingrained in human perception and anything offensive to the eye in a stationary object like a building, when looked upon as an assembly of materials subject to gravity, most likely would not stand up to the scrutiny of logic if it contains some artificial, and forced devices. It would follow that the understanding of structures and their laws could help to formulate some features of styles, and later, to preserve their soundness and allow for their refinement, to give a truer ring to the concept of "structural expression", used often to explain the exterior of the building which is entirely non-structural. It should also guard against the pitfalls of what one might call "structural fashionettes" which appear from time to time in the architectural repertoire, *eg* current zig-zag roof lines or hyperbolic paraboloids.

A FEW concluding remarks will be attempted now. Science and technology offer considerable challenges to the architect by the elimination of many physical restraints of shape and size and by the expansion of his range of geometry. Although quite a few of the new possibilities have been exploited, the growing trend to abandon structure and other physical aspects to the specialists leads frequently to an artificial separation of form and structure, leaves many alternatives unexplored, and often results in haphazard and accidental advances, spurred more by vested commercial and professional interests, than by concern with integrity and quality of design.

The large volume of factual data on materials, processes, etc, is important primarily for the executers of work; complexity of structural theories are related mainly to the analysis, while their performance and information necessary for the designer are comparatively simple and can be mastered by him as one of his working disciplines without undue effort. The creative use of structures, the development of new forms, either for impressive large areas or for more modest details, does not demand familiarity with intricacies of stress analysis or higher mathematics, but imagination, logic and a thorough grounding in basic concepts of structures, grounding which would give an almost intuitive grasp of the balance and flow of forces. Even without an extraordinary creative ability, which is a gift of Providence, such a grasp, which in contrast can be fairly easily acquired, would allow us to look at the works of Nervi, Buckminster-Fuller or Candela without awe, but with conscious appreciation, to offer criticism where it is due, and to use the solutions of more gifted spirits in a right way and place–even improve and refine them. Concern with and understanding of physical principles would also overcome the stifling effects of formalism and standardization which accompany technological progress, but are contradictory to the potential freedom brought by such progress.

Halifax County Municipal Building, Halifax, N.S.

ARCHITECTS
C. A. Fowler & Company, Halifax

MECHANICAL AND ELECTRICAL CONSULTANTS
F. C. O'Neill & Associates

GENERAL CONTRACTORS
Foundation Maritime Ltd.







HALIFAX COUNTY administers a very large residential and rural area around the cities of Halifax and Dartmouth.

The Halifax County Department's offices were located in many and varying locations within the City of Halifax and inter-departmental co-operation as well as public access were severely limited. Therefore this lot just outside the city was purchased and developed to house all the administrative departments and the council chamber in one building.

The plan form was the logical result of the need for a number of departments, each accessible from a public area, with a minimum of through traffic. At the same time it avoided the harshness of a simple rectangular block being erected in the naturally informal surroundings.

The building blends into the surroundings with the colour accent of the bright red panels acting as contrast to the stonework as well as to the trees. From the upper storey a fine view is obtained down the North West Arm of Halifax Harbour. A feature of the building is the siting, the retention of the majority of the trees, also the development of a swampy area to form a brook and ponds.

Semi-basement comprises heating plant, janitor's apartment, staff lunch room, county library and welfare department. Main floor — warden's office, municipal clerk's offices, council chamber, committee room, collection department, assessment offices. Top floor comprises accountant, school board, county architect, engineer's offices.

STRUCTURAL SYSTEM

Steel frame and open truss joists with concrete slab floors.

MATERIALS & FINISHES

Masonry — Lake Echo Bluestone. Combination wood and aluminum window wall, with sealed double glazing and porcelain enamelled panels.



Top left: Front elevation from main highway

Centre left: Council Chamber

Lower left: Entrance vestibule

Below: Main entrance from the north

PHOTOGRAPHS BY MAURICE CROSBY



UNDERGROUND WIRING . . . IS IT FEASIBLE?

THE RAIC COMMITTEE OF INQUIRY into the Design of the Residential Environment, when it reported to the profession and to the federal government in June, 1960, recommended that "the various public bodies setting power and telephone rates be pressed to undertake a concerted study to compare the costs per year of use of underground and overhead distribution system in the various conditions that prevail in Canadian urban centres, and to publish the results."

During the following weeks the Institute appointed Edmund Fox as Special Assistant on loan from Central Mortgage and Housing Corporation, and secured $12,500 in contributions from members of the profession to provide the practical means of implementation. Discussions took place between the President of the Ontario Association of Architects and the undersigned, and officers of the Canadian Electrical Association. Later the Canadian Federation of Mayors and Municipalities evinced a keen interest in having municipalities study the feasibility of introducing underground wiring, whether in residential sub-divisions or in commercial downtown areas.

Early in 1961 a joint meeting of committees representing the Town Planning Institute of Canada and the RAIC decided to develop a national promotional campaign which has urged public utilities to review comparative costs of overhead and underground systems, and municipalities to study the benefits of converting local wiring plans wherever possible. The RAIC distributed press releases to all nine Provincial Associations in early July and the editorial response of daily newspapers from coast to coast indicates a widespread belief that ugly overhead wiring in our major cities, at least, can be progressively buried.

On August 4 the Mayor of Ottawa made a public announcement that the National Capital, in co-operation with Ottawa Hydro, proposed to develop a five-year campaign during which time overhead wiring on main thoroughfares in the central area of Ottawa would be placed underground. In Winnipeg the Mayor has asked for all available information from the President of the Manitoba Association of Architects and a similar reaction is reported from municipalities in the Vancouver area.

The RAIC hopes that the bright glare of publicity which has been cast upon this program will result in the rate-setting bodies agreeing to co-operate with municipal bodies, the architectural profession, and the public at large to produce cost analyses of underground and overhead distribution systems for widespread publication.

The current campaign will bring answers to the question of whether the utilities, municipalities, and ratepayers are really interested in promoting and encouraging ways and means of accelerating the progressive installation of wiring underground, or whether they are content to preserve the status quo.

L'enfouissement des fils est-il possible?

DANS SON RAPPORT *à la profession et au gouvernement fédéral, en juin 1960, le Comité d'enquête sur les conditions de l'habitation a recommandé "que l'on fasse pression auprès des autorités publiques chargées de fixer les tarifs d'électricité et de téléphone, afin qu'elles entreprennent une étude comparative concertée de ce que coûteraient par année respectivement un réseau de distribution souterrain et un réseau de distribution par fils suspendus, dans les diverses conditions régnantes dans les centres urbains du Canada, et qu'elles publient le résultat de leur étude".*

Au cours des semaines suivantes, l'Institut s'est nommé un adjoint spécial dans la personne de M. Edmund Fox, prêté par la Société centrale d'hypothèques et de logement, et a recueilli des membres de la profession $12,500 afin de prendre des mesures d'ordre pratique. Le président de l'Association des architectes de l'Ontario et le soussigné ont eu des entretiens avec des représentants de la Canadian Electrical Association. Plus tard, la Fédération canadienne des maires et des municipalités s'est montrée vivement intéressée à une étude, par les municipalités, de la possibilité d'enfouir les fils, soit dans les subdivisions résidentielles soit dans les quartiers des affaires.

Au début de 1961, lors d'une assemblée conjointe, des comités de l'Institut d'urbanisme du Canada et de l'IRAC ont décidé de lancer une campagne nationale afin d'amener les sociétés d'utilité publique à déterminer le coût comparatif des réseaux de distribution aériens et souterrains et les municipalités à considérer les avantages de plans d'enfouissement des fils partout où la chose est possible. Au début de juillet, l'IRAC a envoyé aux neuf associations provinciales des communiqués destinés aux journaux. Les articles de rédaction publiés dans les quotidiens de tout le pays ont démontré que de façon très générale on croit à la possibilité de faire disparaître graduellement, du moins dans les grandes villes, ces fils suspendus qui déparent les rues.

Le 4 août, le maire d'Ottawa a annoncé que, de concert avec l'Hydro-Ottawa, les autorités municipales songeaient à une campagne de cinq ans destinée à faire disparaître les fils aériens le long des principales artères du centre de la capitale nationale. A Winnipeg, le maire a demandé au président de l'Association des architectes du Manitoba de lui fournir tous les renseignements possibles à ce sujet. Un intérêt semblable a été manifesté dans des municipalités de la région de Vancouver.

L'Institut espère que la publicité faite au programme portera les autorités chargées de fixer les tarifs à collaborer avec les services municipaux, avec les architectes et avec le public en général à une étude comparative du coût des réseaux de distribution souterrains et aériens et à une large diffusion des résultats obtenus.

La campagne actuelle permettra de savoir si les sociétés d'utilité publique, les municipalités et les contribuables désirent trouver les moyens d'accélérer l'enfouissement des fils ou s'ils préfèrent l'état de choses actuel.

Robbie

from the inside to the outside, and there appeared to be no harmful effects of condensation in the walls. When high relative humidity is maintained in a building, however, and the outside air temperature is very low, as may be the case in many areas of Canada in the winter, there is danger of condensation of water vapour in the walls and of frost action. Under these conditions it seems wise to provide vapour barrier protection to cavity walls, particularly if the cavity contains insulating material.

Building Code Requirements. Special requirements for construction of cavity walls, particularly limitations on height, are contained in most building codes. The National Building Code of Canada 1960, for example, states that the maximum height to which a cavity wall may be built above its bearing support is 36 feet. For buildings taller than this it is necessary to provide intermediate bearing support so that the allowable height above the support is not exceeded.

The minimum thickness of a cavity wall is 10 inches, the cavity being not less than 2 nor more than 3 inches wide. For load-bearing cavity walls the National Building Code requires that the minimum thickness of the top 12 feet be 10 inches, that of the portion more than 12 feet but not more than 24 feet from the top 12 inches, while that part of the wall more than 24 feet from the top must be at least 14 inches thick. As for solid masonry walls, lateral support, either horizontal or vertical, must be provided for cavity walls.

It is generally required by building codes that mortars of relatively high strength be used in cavity wall construction, probably because resistance of the thin outer part of the wall to lateral force is important. A general rule seems to be that mortar for cavity wall construction should be at least as strong as a mortar containing equal proportions by volume of lime and portland cement. At the same time it should possess good workability and water-retention properties.

Conclusion. Cavity walls provide an important advantage over walls of solid masonry in that they can afford complete protection against rain penetration even when exposed to conditions of severe wetting by wind-driven rain. Under similar conditions rain leakage through solid masonry walls is not uncommon. There are three essential requirements for cavity wall construction: the cavity wall must have a gutter at its base to collect leakage water and drains to direct water out of it; the two parts of the wall must be anchored together with metal ties that are corrosion resistant and adequately strong; the wall must have a cavity free of mortar or other material that may form a water bridge across it.

Cavity walls provide another advantage over walls of solid masonry in their improved thermal insulation value. They may also be used as either load-bearing or non-load-bearing elements. They have been used in many countries over a long period of time and have established their excellent performance record under widely varying conditions.

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various consultants and to control their contributory skills. He must be the captain and *orchestrator* of the design team.

Last year I spent two hours trying to convince an otherwise intelligent and cultivated gentleman of Montreal that the architects of a particular project had to control the terms of furnishings in solving their planning problems and who are, therefore, better qualified than others to decide which furnishings shall be most appropriate, functionally and aesthetically, ought to be engaged for this part of the work.

To compete successfully in this field, however, it is necessary that one be sincerely interested, be competent to judge

good design, including construction, materials and finishes and be familiar with sources of supply and costs. An architect entering into this field without previous experience will, we are sure, be amazed at the amount of time and effort required to do the job properly.

Nevertheless, the furnishing of buildings, particularly those which one has designed, is challenging and rewarding and, as stated above, we believe architects can successfully compete in this field while maintaining their pure professional status. *Gordon S. Adamson, Toronto*

The independent interior designer enjoys advantages over the architect in competition for the designing and decorating of existing buildings on account of, among other things, his method of soliciting business.

With regard to new buildings for which the architect has already been commissioned, the situation is very different, on account of the established relationship between the architect and the client.

The inference contained in the question is that the architect might be at a disadvantage on account of the fact that the proffered fee of the interior designer may appear low because of charges which are not always comparable.

This may be so. On the other hand, the architect presumably enjoys the client's confidence, and with this advantage he should be able to convince him that he should be allowed to complete his design by the inclusion of the interiors, and that he can and will serve him better than some third party could do. This assumes, of course, a properly constituted client-architect relationship, the lack of which may often be at the root of the difficulty where such a difficulty exists.

If architects generally are not able to establish their position as the designers of their complete buildings, they will have little chance of convincing the public at large that they should be entrusted, as the President of the AIA suggests, with the design of the whole field of our environment, from spoons to cities and regions.

If Mr Will is even only partly right as to our abilities and our opportunities, we should have little difficulty in competing with others for the responsibility of designing the interiors of our own buildings, and doing so within the bounds of professional ethics.

For interiors of existing buildings, I believe that the architect is at a disadvantage in competition with all the resources of commercialism, a disadvantage which would take much of his time, energy and powers of persuasion to overcome.

R. Schofield Morris, Toronto

BOOK REVIEWS

"In Praise of Architecture" by Gio Ponti. Translated from the Italian by M. and G. Salvadori. Published by F. W. Dodge Corp, New York. 270 pages. Price $6.95.

This is not a book at all, in the conventional sense, but a high-powered blast of notes, quotations and sketches from the high-powered Milanese architect and director of Domus, Gio Ponti.

On Page One, Signor Ponti says that "It was not written to lay down laws but rather to encourage debate". For this purpose he has produced a very amusing, stimulating and successful piece. It should probably be read only about a page or two at a time, but kept handy like a kind of Architectural Thesaurus. There are epigrams by Ponti, quotes from Le Corbusier, Rayner Banham and from dozens of unidentified friends of the author.

In addition there is the usual pseudo-philosophical argument, which has been the bane of architectural writing ever since Louis Sullivan, in which architecture, theories of painting, concepts of nature and of the good life are all jumbled up and thrown into an intellectual stew pot. The only recognizeable elements derive from nineteenth century American Progressives and German Romantics. In my opinion the proper place for most of this sort of stuff is in the trash basket unless the author is prepared to do some work on it before letting it get into print.

One of Signor Ponti's most entertaining techniques, which he uses several times, is a combination of sketches and discussion with wide-ranging references. One such is a charming piece called "A lesson concerning a bathroom"; another one is "The staircase". Here we can get some delightful glimpses of how he designs, of where he makes major decisions, of his extraordinarily acute visual sense, and of his intense drive to try to make every building a work of art.

Altogether an odd-ball book, but very good fun in small doses. *W. S. Goulding, Toronto.*

Moncton Renewed, H. Spence Sales, City of Moncton. 34 pages. No charge.

This booklet, while specifically a summary of a completed urban renewal study for Moncton, can stand also as a brief case study of urban problems of growth and decay, with procedures for dealing with them.

Put out by the City of Moncton, it aims at acquainting citizens with the city's problems and gaining their participation in renewal objectives. This may explain the booklet's format which is marked by brevity of text, a certain artfulness in presentation and an exhortatory style at times quaint. As examples of the latter, the acknowledgement states, "If credit is to be given we must wait until the plan has been fulfilled, and then, all honour to the people of Moncton", and on the final page in large type

*"THUS
WILL THE CITY PROSPER
AND
ONE DAY BECOME A PLACE OF WONDER"*

This slim booklet shows that what was financed by the federal and provincial governments as a renewal study has in fact blossomed into an official plan. It is natural that a renewal study must embrace the whole city and not confine itself to a worn-out centre. What is interesting is this possibility for official plans to be largely financed by senior governments. What seems unfortunate is that smaller municipalities in need of financial assistance cannot readily tap this source because they are unlikely to show the requisite conditions of decay.

E. Halfhide, Toronto

Ad Hoc Committee Revises Competition Code

During the first half of 1961 an ad hoc committee comprising H. Gordon Hughes (F), Ottawa; James Strutt, Ottawa; Francis Nobbs (F), Montreal, and Edouard Tremblay, Montreal, met at Ottawa frequently to make a comprehensive review of the existing Code for the Conduct of Architectural Competitions. The latest meeting took place on August 22.

As a result, revised drafts of the Code have been forwarded on three occasions since last June by the RAIC to special review committees formed for the purpose in the Provincial Associations.

It is hoped that a draft document, satisfactory to all parties, will emerge within the next few weeks, and be published and distributed this year.

RAIC Adopts New Price Scale for Contract Documents

Effective October 1st, 1961 a new price scale for the sale of contract documents to architects, contractors and others, will be inaugurated. The RAIC has announced that the new rates follow an understanding reached between the Institute and the Canadian Construction Association.

During 1961 the RAIC Legal Documents Committee made substantial revisions to the Client-Architect document (No. 6AQ) and the Standard Form of Construction Contract (No. 12). Both documents have been reprinted in English and French.

Provincial Associations have been informed regarding the new price scale. As in the past, documents may be ordered by members either from Provincial Associations or direct from the RAIC. The new order forms will be available upon request.

The revised prices are as follows:

6AG (Client-Architect Agreement Form)	$ .10
6AQ-F (French version of 6AQ)	.10
10 (Construction Tender Form)	.10
10-F (French version of No. 10)	.10
12 (Construction Contract-Stipulated Sum)	.25
12-F (French version of No. 12)	.25
13 (Construction Contract – Cost Plus)	.25
13-F (French version of No. 13)	.25
A Suggested Guide to Bidding Procedure	.25
Bound Document Sets—one of each of the above	1.00
1961 RAIC Membership List	15.00
RAIC-AIA Standard Filing System and Alphebetical Index – Price in Canada	3.00

Ottawa, Vancouver and Montreal Organize Architect-Supplier Local Joint Committees

The initiative taken by the RAIC and the Manufacturers and Suppliers Section of the Canadian Construction Association in early 1961 to form the Canadian Joint Committee on Building Materials has led to the formation of architect-supplier committees at the local level in Montreal, Ottawa and Vancouver.

At these major centres representatives from architect chapters and builders' exchanges are co-operating to organize useful joint committee meetings during the coming winter.

The Ottawa chapter of the Ontario Association of Architects and the Ottawa Builders' Exchange sponsored an inaugural meeting at Ottawa on September 13 which was featured by a panel discussion on the architect-supplier relationship.

Plans are being made for the ten-member Canadian Joint Committee on Building Materials to meet at Ottawa during the third week of October.



James Secord and Saul Herzog win Red Deer Civic Centre Competition

Announcement was made on August 25 that the first prize in the national competition for the design of a civic centre and city hall for Red Deer, Alta, has been won by James Secord and Saul Herzog, of St. Catharines, Ont. The award is the commission and an advance fee of $5,000. Second prize of $750 was awarded to Gerhard Blum of Calgary; and third prize, $500, to Portnall, Grolle & Lucas of Regina. There were 20 entries. The jury was composed of Peter M. Thornton (F), professional adviser; Nial C. Carner, Red Deer; Paul Thiery, FAIA, Seattle; Viljo Revell, Toronto and Otto Safir, P Eng, Vancouver.

Canada Council Scholarships

Approximately 75 Pre-Master's degree scholarships are offered in the 1962-63 Canada Council program. The average value is $1,500 for one academic year, renewable. For architects the scholarships are tenable in Canada and abroad. Completed forms and supporting letters must reach the Council at 150 Wellington St., Ottawa, by November 15, 1961.

Position Vacant

WANTED: Architect-Designer, university graduate, as design assistant to R. A. Dick, to whom please apply. Objective, future associateship. Marani, Morris & Allan, Toronto.

PROVINCIAL NEWS

OBITUARIES

GORDON M. WEST (F), FRIBA, a Past President of the RAIC, died in Toronto on August 5, at the age of 74 years. A native of Toronto, Mr West graduated from Jarvis Collegiate. He obtained his architectural education under the apprentice system, and spent some years previous to the First World War in the offices of Darling and Pearson, George Gouinlock and others.

During the First World War he went overseas with the Queen's Own Rifles, returning with the rank of Major in the 12th Battalion, Canadian Engineers. Following this he went into partnership in the firm of Molesworth, West and Secord, which firm had many buildings to their credit, including the E. R. Wood, Milton Cork, Sir Joseph Flavelle residences, YMCA and YWCA buildings, Wymilwood at the University of Toronto, buildings at Thorncliffe Race Track and many others. Here his efforts were mainly in the executive and supervising end of the work.

Following the Second World War he formed the firm of West and Switzer, producing a wide variety of buildings, residential, industrial and commercial, including the War Amputations Building. Here he developed considerable business specializing in the alteration and modernizing of older buildings.

Mr West showed great talent in business organization and financial affairs and had broad experience in committee work of many kinds. During the early thirties he was quite active in the affairs of the OAA and the RAIC, serving on the Executive, and being President of the RAIC from 1932 to 1934. He was President of, and largely responsible for, the organization of the National Construction Council and worked on briefs for presentation to the Rowell Sirois Commission. Mr West travelled extensively in England, Scotland, France, Italy, etc. For years an enthusiastic member of the Board of Trade and Board of Trade Club, he had long time service on various committees especially on Assessment and Engineering groups. He was also a member of the Arts and Letters Club, the Lambton Golf and Country Club, the Toronto Tennis Club, the Chattan Debating Club and military groups. Surviving are his widow, the former Elsie Fox of London, England, his son, Dr Gordon F. West of the Geo-Physics Department of the University of Toronto, and one brother, R. Bruce West of Toronto. The profession owes a great deal to the efforts of the late Mr West in helping to establish the Ontario Association and strengthen it in the dark days of the thirties, and his many colleagues and friends extend most sincere sympathy to his wife and family.

Roy J. Switzer, Toronto

ALLAN GEORGE was born in England on 31st July, 1874, a son of the late Sir Ernest George, RA, eminent architect of his day and etcher and watercolorist of authority. He got his early education at Blundell's, one of the old Public Schools, studied architecture at the Royal Academy School, and was apprenticed to his father's firm before coming to Canada in 1911.

After working in the offices of Darling & Pearson and Sproatt and Rolph, he joined the writer in a partnership in 1913 which lasted for 47 years, with gaps during World Wars I and II, until he retired about a year prior to his death on July 25th, 1961. Forty-seven years together in understanding and harmony must be something of a record.

He was elected a Fellow of the Royal Institute of British Architects in 1930, a Fellow of the Royal Architectural Institute of Canada in 1944, and an honorary member of the Ontario Association of Architects in February, 1961.

Every life span brings change, but never has the world moved so fast as in the last few decades. Scientific advance has altered our material and moral values and art is striving to interpret the changed aspect of modern life.

As a man grows old his problem is one of continual adjustment, and Allan found it hard to turn from the traditional pattern to the more uninhibited forms of modern architecture. Above all things he hated self-conscious attempts at originality.

However, bitterness was not in Allan's nature. He had been brought up in the strict code of ethics and manners that ruled the British middle-class of his early years. He absorbed the spirit of justice and fair-play that governed track and field sports, in which he excelled in youth, and this spirit carried him through his long life. Always a keen golfer; he played both in England and Canada, at one time having a handicap of 2.

"Manners makyth man" they used to say, but with Allan it was a sincere and honest attitude. His courtesy never varied and his humanity made him friends among all sorts and conditions of men. It was often a matter of surprise to the writer how Allan's quality was discerned and appreciated by clients, contractors and craftsmen alike.

Notable among the works of his firm are the following:

Domestic: 1920, residence for the late Col F. B. Robins, Armour Heights; 1926, residence for the late Mr G. R. Larkin, Castle Frank Rd; 1929, residence for Lt Col H. D. L. Gordon, DSO, Beaumont Rd; 1936, residence for the late Mr H. Rupert Bain, Oriole.

Ecclesiastical: 1922, Christ Church, Deer Park; 1927, Yorkminster Baptist Church; 1929, Erskine United Church; 1954, Trinity College Chapel, as associate with Sir Giles Scott, OM, RA, Architect.

Collegiate: 1938 and 1960, St Hilda's College, Devonshire Place; 1941, Strachan Hall and residential additions, Trinity College.

Commercial: 1936, The Toronto Stock Exchange, with the late S. H. Maw as associate architect.

Who can tell how the last of the traditionalists will stand in architectural history? Possibly they will be remembered among the early Canadian architects such as Lane, Thomas and Cumberland. One thing is certain, that Allan George will long be remembered among his many friends for his outstanding human qualities.

Walter Moorhouse

REGISTRATIONS

Alberta Assn. of Architects

June 14, 1961

WONG, Jacob, B.Arch (Man) ARIBA; *Ste. 19-700 Corydon, Winnipeg, Man.*

July 1, 1961

WORKUN, Morley, B.Arch (Man); *10709-74th Ave., Edmonton, Alta.* (J. McIntosh).

Ontario Assn. of Architects

May 26, 1961

ALA-KANTTI, Harry, B.Arch (McGill); *1381 Kingston Ave., Ottawa.* (Samuel A. Gitterman).

ARMSTRONG, Gerald William, B.Arch (McGill); *303 Islington Ave. N., Islington.* (Gordon S. Adamson & Associates).

COOKE, John W., B.Arch (McGill); *422 Comeau Street, St. Lambert, Que.* (John W. Cooke).

FARROW, George Blake Philip, B.Arch (Toronto); *14 Forsythe St. S., Oakville, Ont.* (Dunlop Wardell Matsui Aitken).

HEIDMAN, Stanley Byron, B.Arch (Toronto); *158 Viewmount Ave., Toronto 19.* (Dunlop Wardell Matsui Aitken).

LAMB, Wilfrid Bevan, B.Arch (McGill); *242-A Isabella Street, Pembroke, Ont.* (Balharrie Helmer Morin).

MATHERS, Andrew Sherlock, B.Arch (Toronto); *4 Hillholm Road, Toronto.* (Mathers & Haldenby).

MILLER, Garth Wadsworth, B.Arch (Man); *28 Evermede Drive, Don Mills, Ont.* (Pilkington Glass Ltd.).

RUCHLEWICZ, Michael, Dip.Arch ARIBA, (Polish University College, London), *65 Peace Drive, Scarborough, Ont.* (John B. Parkin Associates).

SMEATON, James Gordon, B.Arch (Toronto), *460 Eglinton Ave. E., Apt 111, Toronto 12.* (John Stuart Cauley).

WELLER, Walter James, B.Arch (Toronto), *45 St. Clair Ave. W., Apt 312-D, Toronto.* (Gordon S. Adamson & Associates).

June 28, 1961

REAM, Gordon Hugh, Dip.Arch. ARIBA, Leicester, England; *18 Truxford Road, Don Mills, Ontario.*

(Continued)

(Registrations concluded)

OKAWARA, Harvey Hideo, B. Arch. U of T; *10 Burnley Avenue, Scarborough, Ontario*

FRANNER, Frank; *1662 - B Bayview Avenue, Toronto 17, Ontario*

LECLERC, Claude, ADBA Ecole des Beaux Arts, Montreal; *3517 Blvd. LaSalle, Verdun, PQ*

Saskatchewan Association of Architects

August 24, 1961

EWING, Roger Keith, MRAIC, B.Arch., *No. 10 Victoria Court, Regina, Sask.*

PADDOCK, James A., MRAIC, B.Arch., (University of Liverpool), *1301-15th St. East, Saskatoon, Sask.*

DIAMOND, Sidney H., MRAIC, B.Arch., *Ste 1-111 First Ave. N.W., Moose Jaw, Sask.*

RAMSAY, Donald D., MRAIC, B.Arch., *2301 Grand Road, Regina, Sask.*

WHITE, T. F. R., *10 Argyle Court, Lorne St., Regina, Sask.*

COMING EVENTS

October 10-13, 1961
1961 National Planning Conference
Community Planning Association of Canada
Nova Scotia Hotel, Halifax

October 20-21 1961
Provincial Symposium on Architecture
Regina, Sask.
Sponsors:
Saskatchewan Association of Architects
Saskatchewan Arts Board
Centre for Community Studies
Community Planning Association

Nov. 2-3, 1961
Interdenominational Conference on Church Architecture
Diocesan Centre
Anglican Church of Canada
Church and Adelaide Streets
Toronto

Jan 28-Feb 3, 1962
"Banff Session 62"
Sponsored by Alberta Association of Architects

Wed, May 30 — Sat, June 2, 1962
55th Annual Assembly
Royal Architectural Institute of Canada
Bayshore Inn, Vancouver, BC

INDUSTRY

Wakefield Lighting Art Metal Line

Wakefield Lighting Limited announces that arrangements have now been completed to market in Canada the products of the Art Metal Company of Cleveland, Ohio. The Art Metal Company is a subsidiary of Wakefield Corporation in the U.S.A.

The addition of Art Metal to Wakefield, expands out the line of lighting equipment to include fixtures for virtually every commercial application. The Art Metal line includes recessed and surface incandescent fixtures which feature the exclusive AMCOLENS. The individual units are precisely designed photometrically and careful attention has been given to mechanical detail.

Catalogue and price information is now available through any of Wakefield's present distributors, sales representatives, or by writing direct to Wakefield Lighting Limited, 644 Highland Road, London, Ontario.

PRODUCT INDEX

SEPTEMBER, 1961

Products advertised in this issue listed in accordance with RAIC-AIA Standard Filing System

THIS INDEX will appear in all future issues of the Journal. It is designed to assist readers in the location of advertisements concerning specific products as well as classifying them for filing.

Continued on Page 84





PRODUCT INDEX

Continued from Page 83

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NO TWO ALIKE

but with one thing in common



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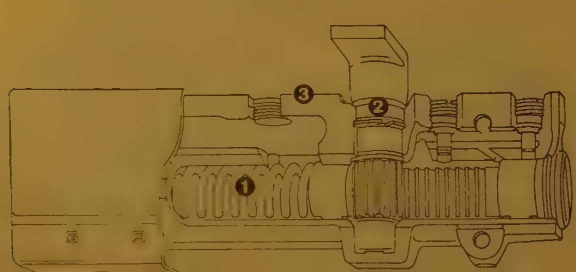
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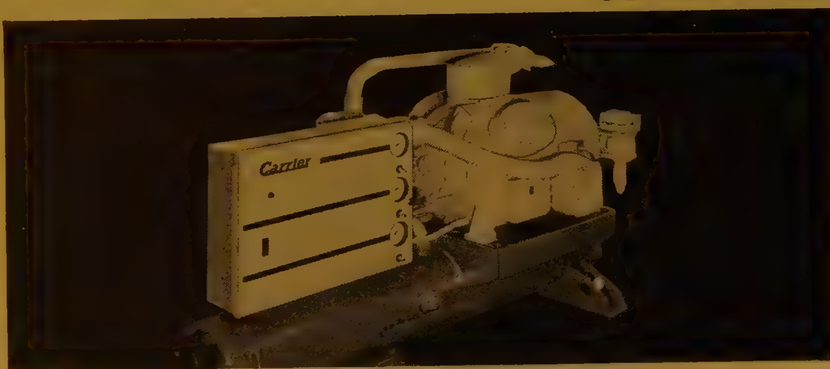
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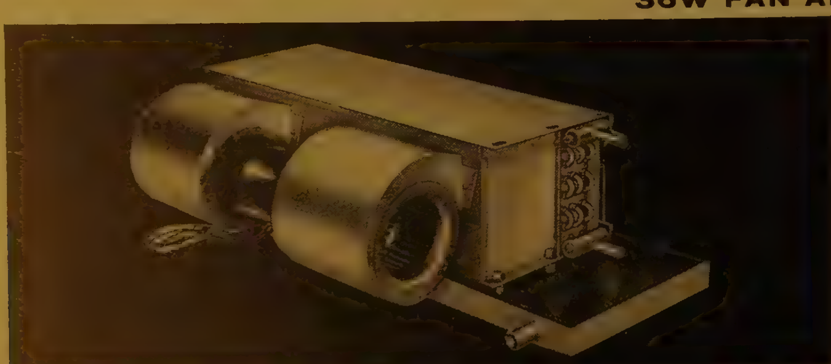
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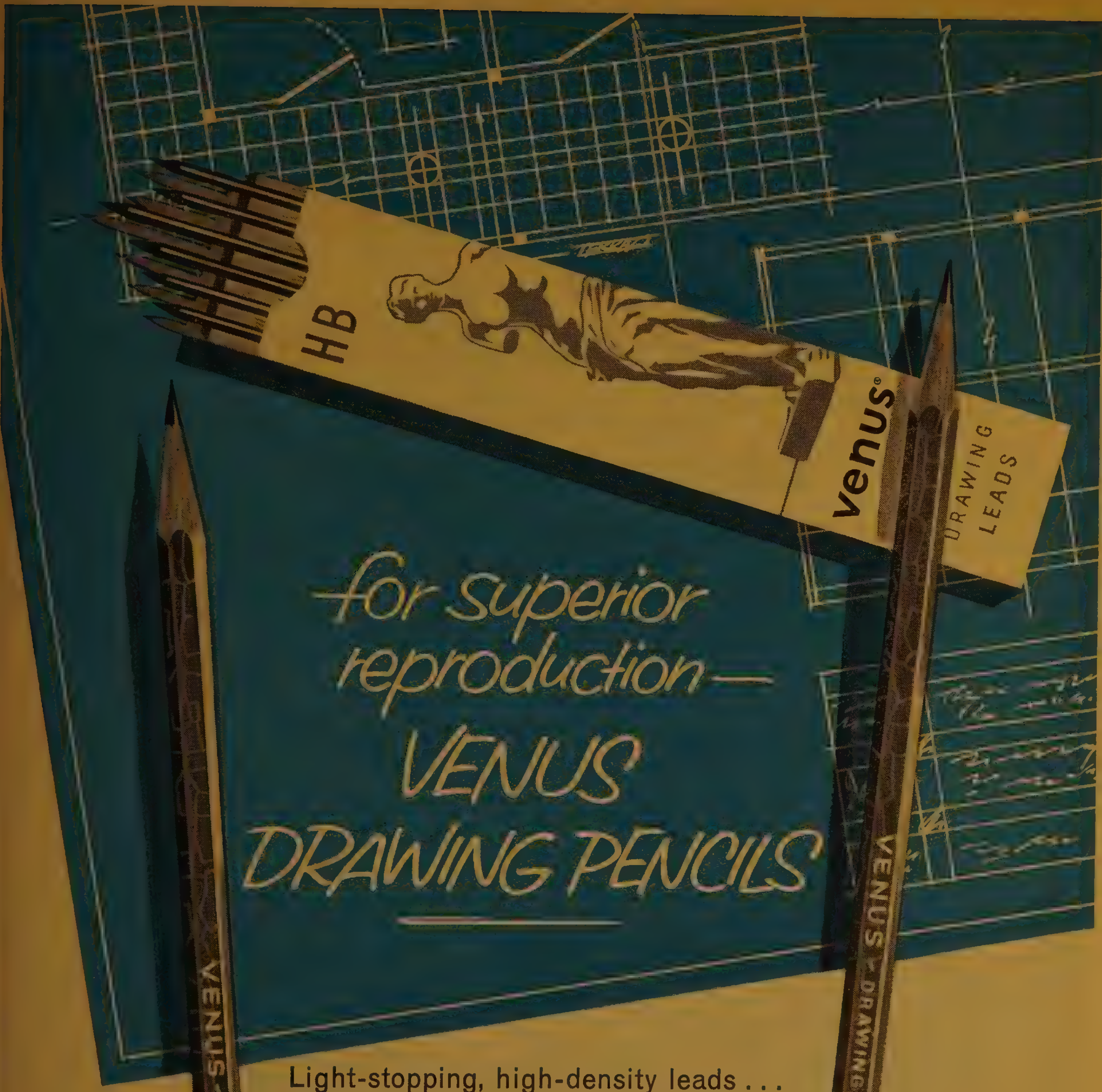
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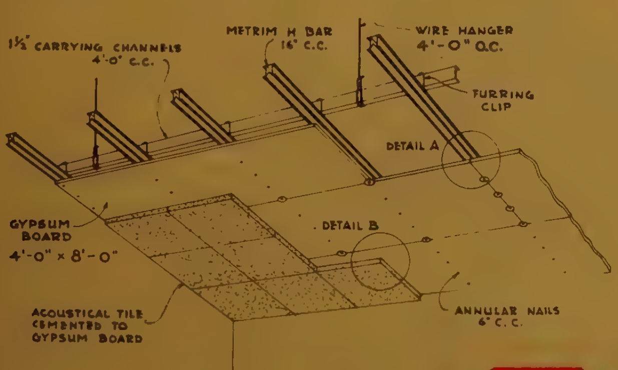
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Sun Life Building, Toronto—a section of the glass and aluminum exterior showing pattern resulting from modular system of construction. Architects: John B. Parkin Associates

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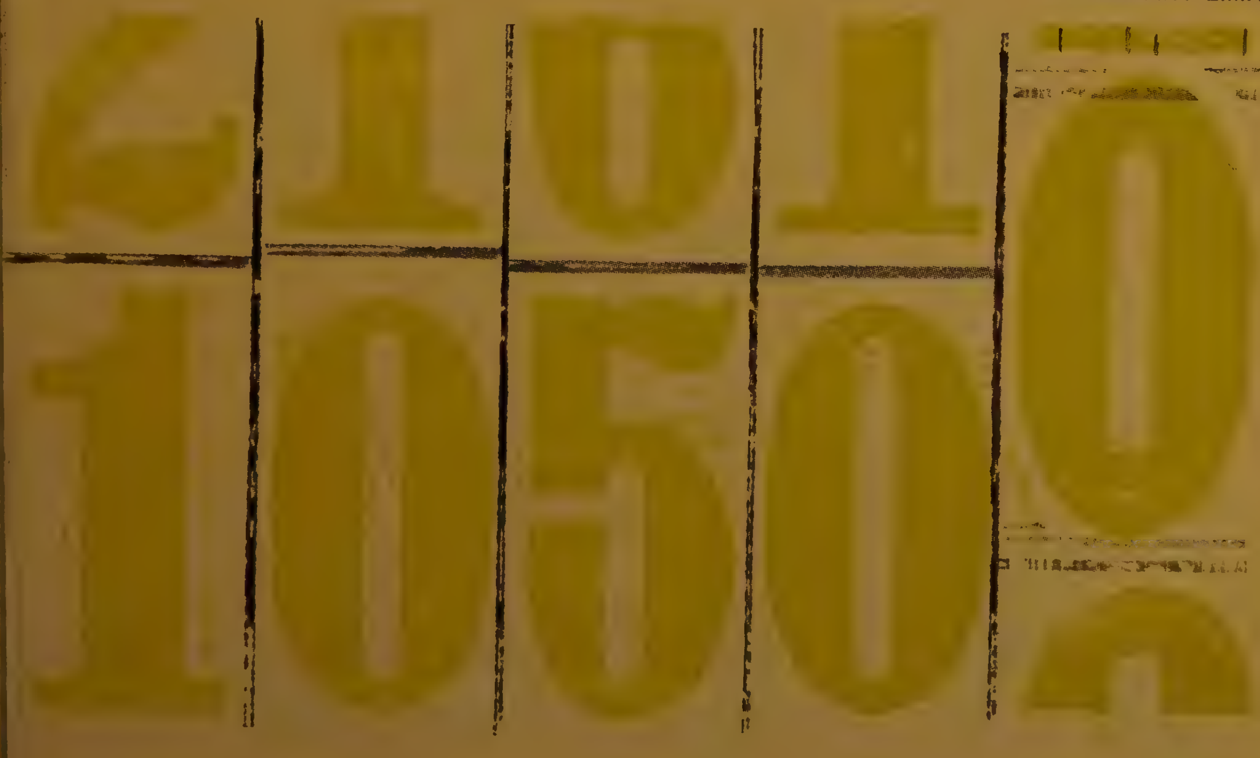
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Among the buildings being constructed by Perini Limited are:

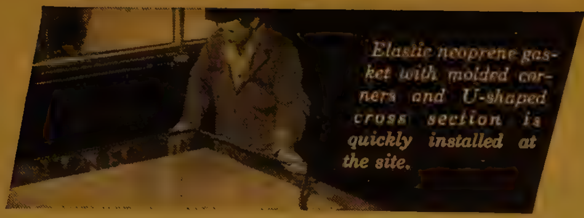
Canadian Bank of Commerce Building, Montreal
National Trust Building, Toronto
Lions Gate Hospital, Vancouver
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Architects: Page and Steele, Toronto, Ontario
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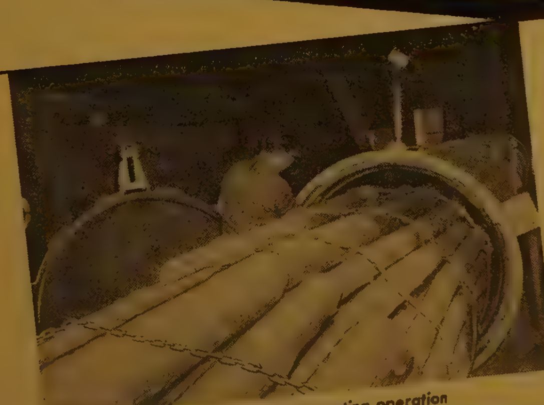
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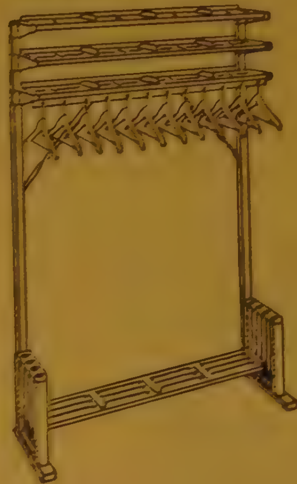
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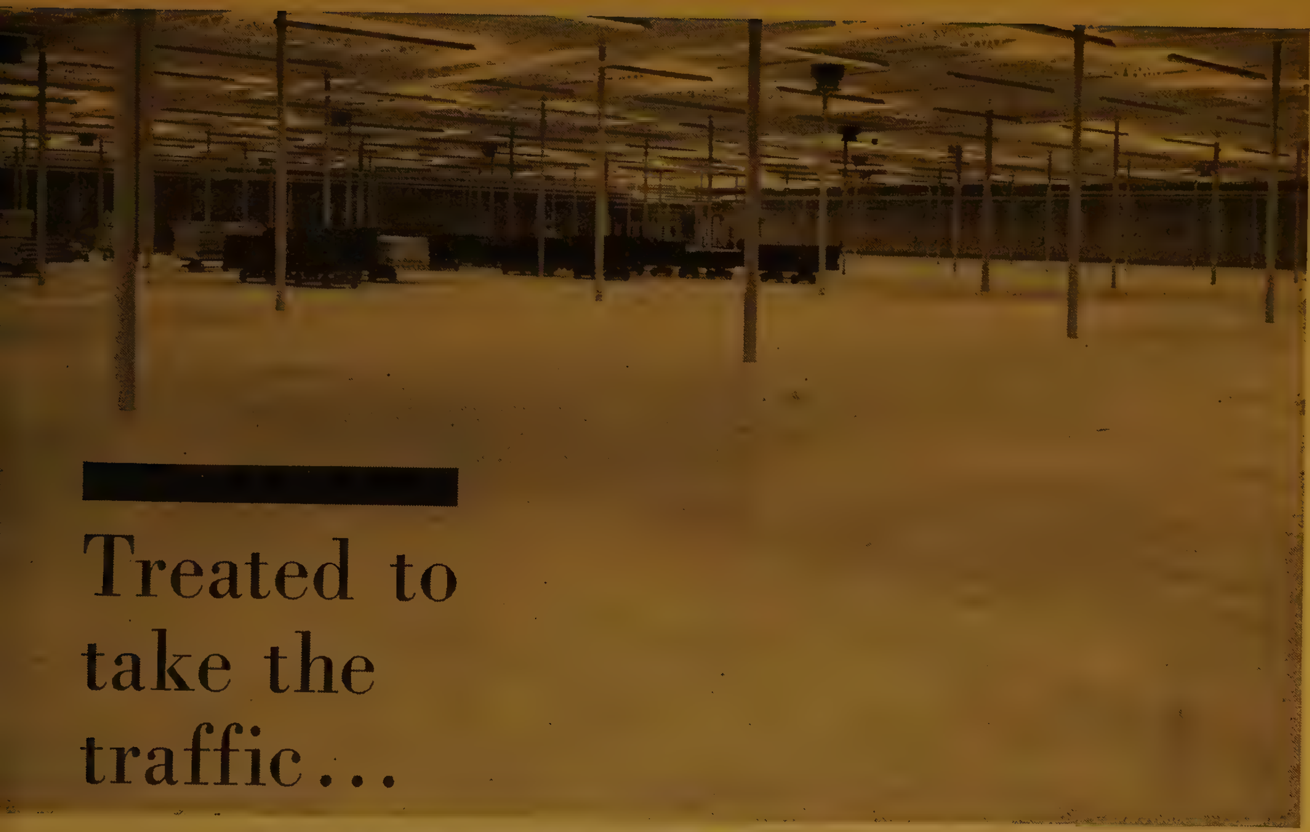
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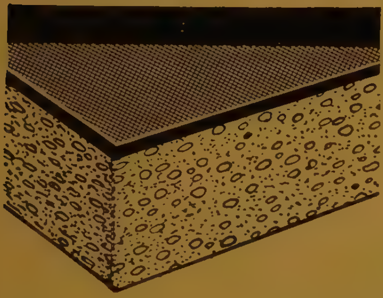


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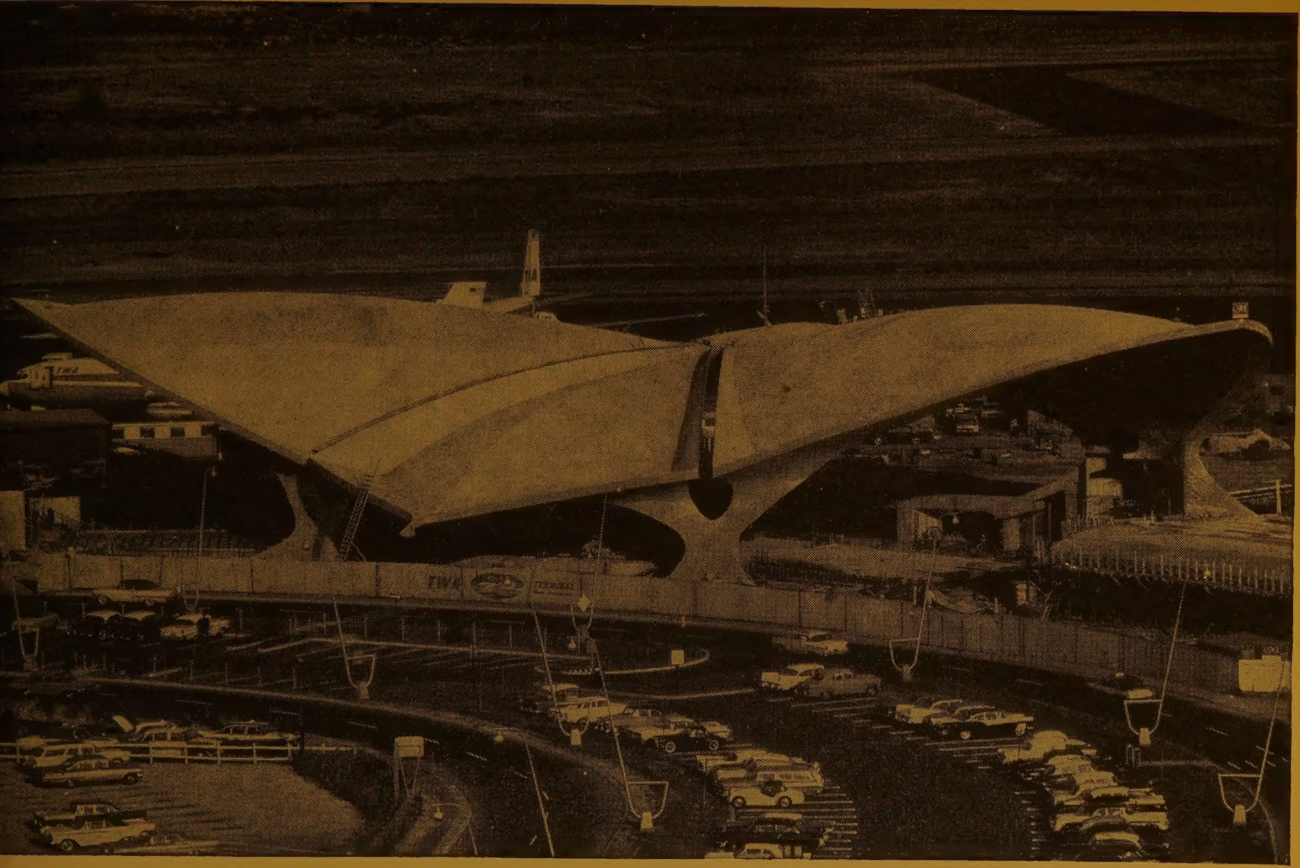
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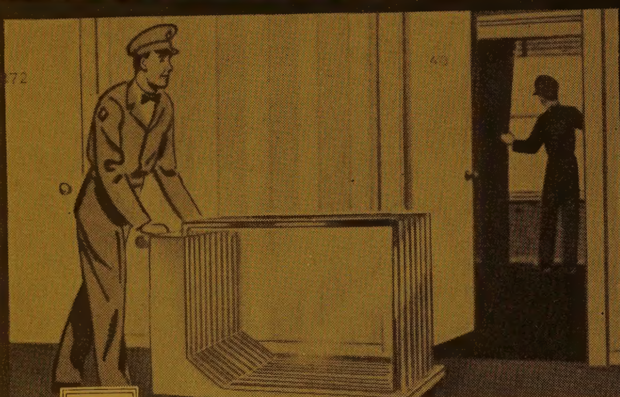
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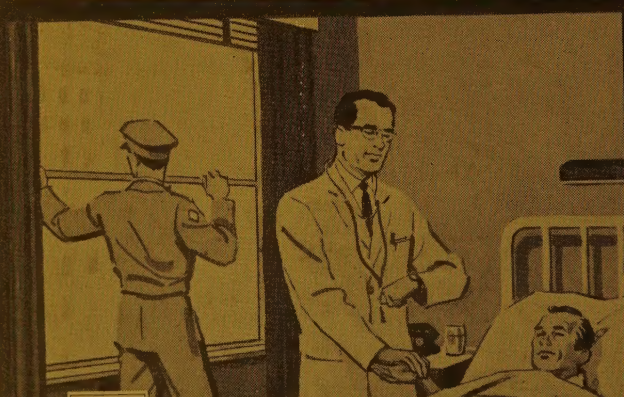
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